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Rediscovering America

THE crisis of the past fortnight has proved the mettle of the American people. Patient, understanding, sympathetic and hopeful, our citizens have demonstrated how free-spirited men can act in time of common adversity. With no peasant tradition of serfdom, with no proletarian consciousness of class oppression, with no caste-enforced submergence of their self-respect, they have no "under-dog" complex to drive them into unreasoning outbursts.

For all they have gone through, Americans know their country as a land which has been and again can be the land of opportunity. They know that it is a land predominantly of enterprising, energetic, resourceful, honest and well-meaning people.

Well aware that they are paying the price of their own folly and their misplaced trust in the grasping few, they have turned their backs on the past and are looking forward to a new deal. Grateful for the unselfish and unremitting labors of the President who has gone, and having the utmost confidence in the President who has come into power, they do not expect the impossible. But they have faith in their ability, under vigorous leadership at Washington, to

purge the land of Mammon's poison and to restore its productivity.

They recognize that this must be done under the handicap of untoward international influences. But they are now in the mood for action. No longer will there be temporizing or indecision. No longer will other nations' troubles take precedence over our own.

With want stalking through many lands, with war invading the Far East and Latin America, and with dissension and unrest permeating Europe, the United States has learned at long last that it cannot settle the problems of the world. America no longer looks abroad. And it is fortunate that this is so.

Looking inward perforce because of the banking crisis, this country has rediscovered its own vast potential strength in material resources and in the sanity, fair-mindedness and courage of its people. America, chastened and united by adversity, and taking stock of proximate possibilities rather than ultimate objectives, has set itself to the task of building up a domestic economy that will be sound, stable, productive and equitable, an economy that will be secure in the face of international convulsions.



Eliminating Red Tape in Controlling Production

PROPER routing of orders through a shop is essential to efficient production and to prompt delivery of materials to customers. While this is important in the shop operating on a production basis, it is doubly necessary in plants in which every order can be classed as a special order.

Such is the case at the Michigan Tool Co., Detroit, manufacturer of cutting tools and special machines. Close attention to control of materials in process has resulted in a reduction of processing time, decrease in inventories of raw stocks and ability to meet emergency requirements of customers. At a time when most companies have adopted a policy of holding stocks down almost to the vanishing point, so that deliveries are measured in hours rather than days, the desirability of meeting service demands of buyers becomes increasingly important.

The Michigan Tool Co. has eliminated red tape. Elaborate forms and index systems, which need constant

By **BURNHAM FINNEY**
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checking by a large clerical force, are frowned upon. A few simple records contain all of the information bearing on production. This is shown best by following an order from the time it is received by the company until it is ready for shipment.

As soon as an order is placed, it is checked to see whether a similar order has ever been filled. If so, the blue print is in the company's files; if not, a blue print should accompany the customer's order when it reaches the company. In case the job is not new, the previous order is referred to for instructions. Then the order is typed and sent to the engineering department, copies going to the shop superintendent and the shipping department. One copy is retained in the office for invoicing purposes and another is attached to the blue print which is sent to the shop.

An acknowledgment of the order is mailed to the customer, a form headed "Acknowledgment" being used for this purpose. On the right side of the form is a brief record of the shop order, listing the order and requisition numbers, date received and date promised. A yellow copy is sent to the company's sales representative, so that he may be informed of the transaction, and a pink copy is kept in the files.

When the order is transmitted from the office to the engineering department, a blue stock card goes with it. This card enumerates the job number, number of pieces ordered, name of customer, date of order, date of delivery, description of work, kind of material and the various departments through which the work must pass in the shop. This card is filled out during its journey from the office to the shipping department. In the shop it stays with the material in process until it emerges from the last inspection as a finished article. Information is added on the card as it

Job No.		No. Pieces on Order				
For						
Date of Order						
To Be Delivered						
Description of Work						
Kind of Material						
Department	No. of Pieces	Date Rec'd	Check'd By	Operator No.	Date Inspect.	Inspect. By
Cutoff						
Lathe						
Milling						
Backoff						
Hardening						
Grinding						
Form Tool						
Remarks						

ACCOMPANYING each order when it is transmitted from the office to the engineering department is a stock card which stays with material in process until it emerges as a finished product, being filled out en route (at left).

EACH order (below) is represented on the visible card indexing system by a follow-up card containing the order number, date received, date promised and description of the work.

SKETCH		
DESCRIPTION AND SIZE		
CUSTOMER		QUANTITY
ORDER NO	DATE REC'D	DATE PROMISED

moves from one department to another, these data including the number of pieces, date received, name of checker, operator's number, date inspected and inspector's name.

In the engineering department the stock order is made out and attached to the blue print and the blue stock card, which are sent to the shop. This form lists the number of pieces, size, kind and weight of materials necessary to fill the order. The price of the material per pound and the total cost also are set down. In the shop superintendent's office the stock order is checked to see that the proper material is ordered, after which the stock order and the stock cards go to the cut-off department where the weight and kind of material are entered on the stock order card and the kind of material on the stock card. These two cards and the blue print then stay with the work during the processing period, except during its journey through the heat-treating department.

When the order begins its journey through the shop, the office prepares and sends to the shop superintendent a follow-up card. These cards are listed on a Kardex visible system on the exterior wall of the shop superintendent's glass-enclosed office in the center of the shop. They contain the order number, date received and date promised. Attached to each card is a colored metal tab indicating the location of the order in the shop. If it is in the milling department, for example, the card has a black tab, or if it is in the hardening department, the tab is purple. The shop superintendent and his assistant constantly refer to this visible card system to keep in touch with work.

Every order coming into the shop is entered in an order book at the shop superintendent's office. Here is listed information in regard to the job number, name of customer, quantity of material ordered, description of the tool ordered, tool number, customer's

BY means of a few simple records the Michigan Tool Co., operating a plant in which every order can be classed as a special order, effectively controls production, thereby reducing processing time, decreasing inventories of raw stocks and increasing its ability to meet emergency requirements of customers. The shop superintendent handles all inquiries from customers about the status of work in the shop. A visual card indexing system helps him to keep a watchful eye on all orders in process.

▼ ▼ ▼

order number, date received, date promised, and the shipping date, which is entered when the order goes out to the customer from the shipping department. This order book is referred to in case a customer should telephone for a report on an order, giving either the tool number or the order number.

All inquiries regarding the status of work in the shop are transmitted to the shop superintendent's office. This saves much time and lost motion usually expended in having such inquiries handled through the office, which eventually must refer to the shop for accurate information regarding delivery dates and other matters pertaining to service. This direct method of answering questions put by customers has made it possible to give the necessary data in 90 per cent of the cases while customers are waiting on the telephone. Moreover, it gives the shop superintendent, who is the man responsible for production, an opportunity to become acquainted with customers.

The shop superintendent is held accountable for all deliveries and promises to customers. He makes no

elaborate written reports to the management, but confers with his superiors periodically about the shop's production program. One of the fundamental principles on which the shop is operated is to exert the greatest possible effort at all times to get work up as far as the finishing department, so as to keep that division constantly flooded with material. Then if a customer requests quick delivery somewhat ahead of the original date specified in the order, it is a simple matter to put it through the final process and send it to him. In many cases this has helped the company to meet unusual demands made by buyers.

In addition to the Kardex system, a production report of jobs going through the shop is kept by the shop office. It lists all jobs in process with the status of each and the approximate shipping date. If for some unforeseen reason an order cannot be delivered on time, the fact is recorded with the estimated date of shipment. For the information of the shop superintendent and his assistant a daily special promise sheet is also maintained, containing the rush jobs with delivery dates. In case of rush orders a red stock card is substituted for the blue card and such orders are given the right of way in the shop.

The revised American standard on steel spiral rods for concrete reinforcement (A38-1933) (simplified practice recommendation R53-32) has been approved by the American Standards Association, 29 West Thirty-ninth Street, New York. This revision of the former American Standard A38-1927 covers largely a rearrangement of the tabular form in which certain data are presented and the removal to tables in an appendix of other data now given for informative purposes.

ALL orders in the shop are listed on a visible card indexing system on the exterior wall of the superintendent's office in the center of the plant. Attached to each card is a colored metal tab indicating the location of the order in the shop.



Effect of Zirconium in White Iron

ZIRCONIUM, alloyed with silicon, has been used as a ladle addition in many instances where special properties are desired in the metal. Recently it was required to make a special gray iron, using a malleable hard iron mixture, producing a gray iron. (This malleable hard iron without any addition would, of course, give a white hard iron.)

It was thought of interest to determine the effect of zirconium as distinct from that of silicon with which it was alloyed. In order to accomplish this result, a series of ladles of molten malleable iron were treated so as to contain constant silicon, with increasing amounts of zirconium. This was accomplished by adding sufficient ferrosilicon to give a final analysis of 2 per cent to the first ladle, with no

addition of silicon-zirconium. The second ladle was treated with 0.1 per cent zirconium in the form of silicon-zirconium, with sufficient ferrosilicon added to give 2 per cent in the final castings. On each successive ladle, the addition of silicon-zirconium was increased and that of the ferrosilicon decreased. The following table gives the results:

Zirconium added Per Cent	Brinell Hardness
0.0	241
0.1	241
0.2	228
0.3	217
0.4	212
0.5	217
0.6	212
0.7	217
0.9	217
1.0	212

The results shown in the table check with practical experience. It is obvious that the zirconium has a

considerable effect on the physical properties of the iron, aside from the effect of silicon with which the zirconium is alloyed. In this particular case an addition of 0.2 per cent starts the softening effect on the iron and 0.4 to 0.5 per cent gives the maximum result. Fig. 1 gives the effect of zirconium on Brinell.

The effect of zirconium would seem to be, in this material, the same as in steel—a deoxidizer and a scavenger. "Work at the Bureau of Standards has shown that residual oxygen after treatment with zirconium-silicon alloys is only one-half to one-sixth as great as after treatment with ordinary ferrosilicon." (THE IRON AGE, June 11, 1931, page 1895.)

Photomicrographs illustrate the structure of malleable hard iron, the same metal after treatment with zirconium and ordinary gray iron. The small size of the graphite in the zirconium-treated metal is of particular interest. It is obvious that metal of this matrix will have a greater degree of strength and impact resistance.

Photomicrographs, Figs. 2 and 3, show a sample of the untreated malleable hard iron. Figs. 4 and 5 show this same metal treated with silicon-zirconium. The zirconium-treated metal appears much the cleaner, although the time for separation of non-metallic inclusions was very short; a matter of only a few seconds.

It would seem probable that zirconium-treated iron would be more machinable and give longer tool life

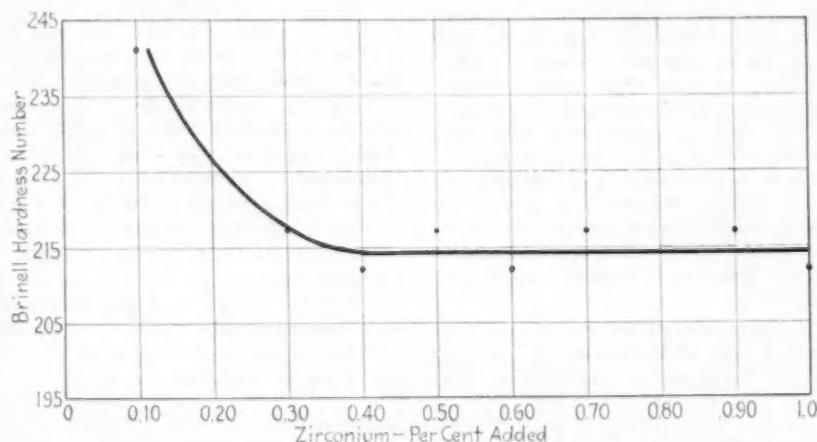


Fig. 1—Effect of zirconium on the Brinell hardness.



Fig. 2—Ordinary malleable hard iron showing inclusions. Unetched. All photomicrographs reduced one-half from 100 diameters.

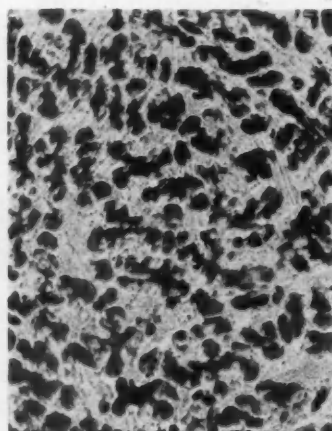


Fig. 3—Same as Fig. 2 but etched. 100 diameters.

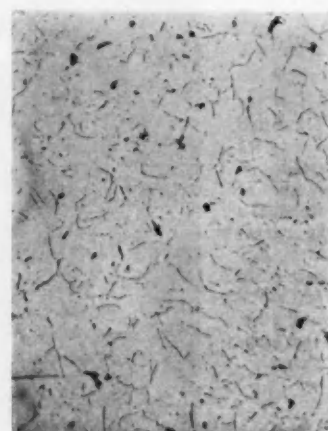


Fig. 4—Malleable hard iron treated with 0.70 per cent zirconium; most of the inclusions eliminated. Unetched. 100 diameters.

White Iron Mixtures

By F. B. RIGGAN and H. C. AUFDERHAAR
Metallurgists, Birmingham, Ala.

EXPERIMENTAL data on the effect of additions of zirconium to gray iron, believed to be of practical value to foundrymen, are offered by the authors in this brief article. Zirconium is shown to have a softening effect and to act as a deoxidizer and scavenger, as well as to render the graphite more finely divided. Tensile strength and elongation are increased. The authors believe that zirconium-treated iron is more machinable and that one of the results is longer tool life.

than an untreated iron, due to the fewer non-metallic inclusions.

Zirconium in Annealed Malleable (Cupola)

The silicon content of a malleable hard iron was increased from 0.60 to 0.78 per cent by means of ferrosilicon additions to the ladle. Another series was brought from 0.60 to 0.78 per cent by means of silicon-zirconium additions. The purpose of this was to determine the actual effect of zirconium additions. All samples were given the regular malleable anneal. Below is the average of eight bars in each series:

Metal Treated With Ferrosilicon		Metal Treated With Silicon-Zirconium	
Tensile Lb. Per Sq. In.	Elong. in 2 In. Per Cent	Tensile Lb. Per Sq. In.	Elong. in 2 In. Per Cent
45,000	8	47,600	9

No attempt has been made at an extended research on the addition of zirconium, but it was thought that the experimental data obtained might be of practical value to the foundrymen.

Rubber-Lined Tanks for Chromic and Nitric Acids

ACIDS of strongly oxidizing character, such as chromic and nitric, have been considered beyond the range of corrosive materials which could be satisfactorily handled in rubber-lined tanks. A new development, which widens the scope of application of rubber-lined tanks to include these powerful oxidizing acids, has been announced by the B. F. Goodrich Rubber Co., Akron, Ohio. Applications, it is stated, will be in chrome plating and in processing of stainless alloys.

Controls Valve by Push Button or Time Switch

For centralized remote control of flows of gases or liquids under pressure, the Northern Equipment Co., Erie, Pa., announces a new Copes thrustor-operated control valve. It is operated by a General Electric thrustor, mounted at the side of the valve by a bracket bolted to the valve bonnet. The thrustor applies a straight-line, constant-pressure thrust on the

valve lever, to open or close the valve, depending on the service requirements. The thrustor operates in one direction only, the weight acting to return it to the original position when the electrical circuit is broken.

The thrustor can be controlled by push button or time switch. External adjustment is provided to increase or decrease speed of the valve movement. The valve, it is emphasized, can operate at a rate of 40 times per minute without injury to any part and has sufficient power to handle heavy viscous liquids.

Penn State Will Conduct Executive Course in June

The eighteenth annual summer course for executives in the fundamentals of production management will be conducted at Pennsylvania State College, June 7 to 15, under auspices of the department of industrial engineering in cooperation with the engineering extension department. The curriculum covers elective courses that include consideration of cost problems and special plant training. Other topics regularly included in the course embrace industrial organization, production control, economic control of quantity and quality and other studies related to industrial management. One session will be devoted to discussing current economic industrial problems.

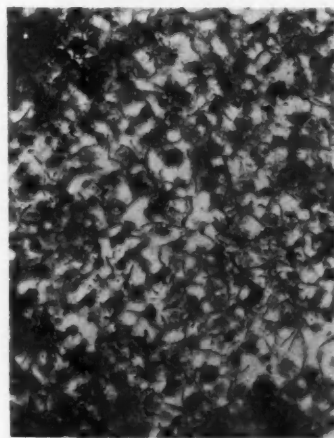


Fig. 5—Same as Fig. 4 but etched; shows small grain and fine graphite. 100 diameters.



Fig. 6—Ordinary grade of cast iron revealing coarse graphite. Un-etched. 100 diameters.

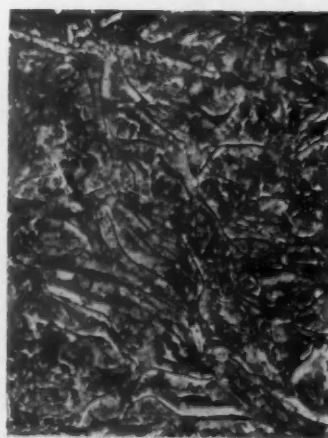


Fig. 7—Same as Fig. 6 but etched. 100 diameters.

Steel Profits Depend Upon Production

ANY change in the price of a commodity is caused by a change in the demand for it. An increase in price is due to an increase in the demand with regard to the available supply. This increase in demand will later be translated into production. Any improvement in both price and production will naturally bring about an increase in earnings. Consequently an increase in price tends to engender a spirit of optimism which is, in itself, an important factor in improving business because it encourages reluctant buyers to make commitments which they have been postponing for better times. Higher prices may effect earnings in two ways. First, they allow the manufacturer a greater margin between his selling price and his cost of production. Secondly, if the higher prices are accompanied by a higher rate of production, the manufacturer can decrease his unit cost by spreading his overhead over a greater number of units.

Since both price and production play a part in the making of profits, this analysis falls into two parts. We must first determine if it is true that the changes in steel prices precede changes in production, or at least, if they move together. If so, it will be sufficient for our purpose to examine the relationship between earnings and prices alone. If price and production do not move together, it will be necessary to analyze their joint effect upon profits.

Prices and Output Do Not Always Move Together

In this analysis we will consider the influence of steel prices and production upon the earnings of the United States Steel Corp., which are available for more than 30 years in comparable form. The steel ingot production of that company will be used as the index of production because the ingot is the common raw material of all finished steel. While a certain portion of the ingot is lost in process, we may assume that percentage to remain fairly constant. For an index of prices, the average annual composite price of finished steel, compiled by THE IRON AGE, will be used.

In order to make these three series readily comparable, each was reduced to a percentage of its respective figure for the year 1919. The relative figures for price and production are plotted on Chart I. It will be noted that in 1905 prices rose slowly while production increased rapidly. In 1909 pro-

duction increased greatly over 1908 while prices continued downward. The year 1912 saw another improvement in production over the previous year in the face of lower prices. In 1915 and 1920, both lines rose together. In 1922 the rise in production preceded that of prices which did not occur until the following year. In both 1925 and 1928 production was higher than in the previous year while prices were lower. If we consider the eight years during the period in which ingot production recorded an increase over the preceding year, we find that in three instances the increase was coincident with an improvement in prices. In four years production increased in the face of falling prices; while in one year, 1922, production actually preceded the rise in price.

Considering the general movements of the two curves over the period, it can be seen that there was a gradual decline in prices from 1902 to 1914 and again from 1923 to 1929. In the first of these two periods production increased steadily while in the latter period it also showed a slight upward trend. Only during the war period do the two curves move together. Clearly there is no fixed and unchanging relation between price and production. While their yearly fluctuations coincide at times, their trends move in opposite directions. Consequently it will be necessary to consider the effect of both factors upon earnings.

Earnings in Relation to Production

The earnings of any company are computed, more or less accurately, by

an elaborate system of accounts. Changes in accounting methods, plant operations, and many other factors may affect the figure for earnings aside from the physical volume of production and the price which it commands. Furthermore there is a certain lag between price and earnings due to the fact that large orders, taken at a certain price in one year, may not be completed until the subsequent year and will affect production records and earnings for the year in which they are completed rather than the year in which they were taken. For these reasons we will examine the trends of price and production as compared with earnings rather than the relationships existing from year to year. Thus we may hope to escape any errors which arise from inherent defects in the figures used. To bring out the trends, a three-year moving average was taken of the relatives for earnings, prices, and production. (The choice of the three-year moving average is based upon an article by W. W. Hay which appeared in THE IRON AGE for Jan. 2, 1930, "Steel Earnings Show Three-Year Cycle.") The resulting curves are shown in Chart II.

The curve for earnings clearly shows three major cycles. The first began with the formation of the corporation and reached its low point in 1913. The second covers the war period and ends in 1921. The third covers the recent period of prosperity and will probably terminate with the present depression. During the first cycle, earnings seem to have depended

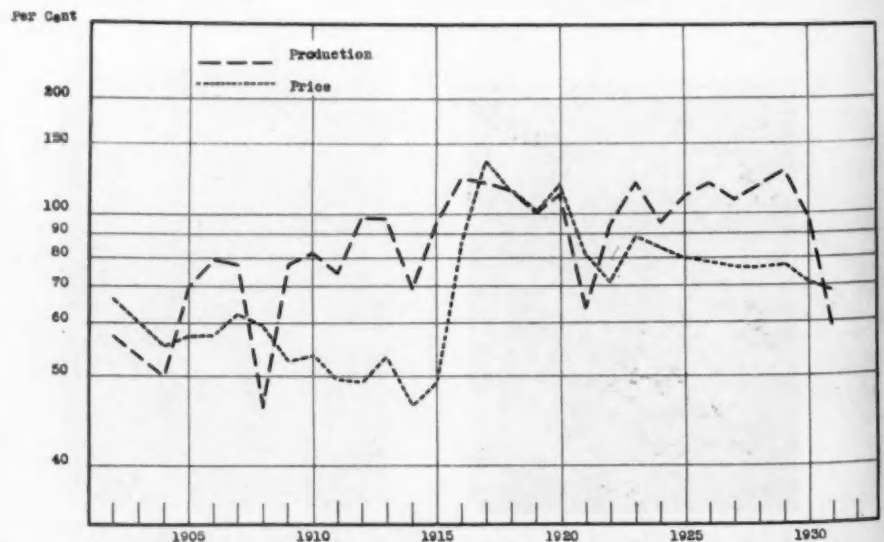


Chart I—Price of finished steel and ingot production of the United States Steel Corp. (Relative to 1919.)

By FRED C. SMITH

STEEL company earnings depend primarily on volume rather than price, according to the author's analysis. Until 1921, earnings paralleled prices, but after that year earnings increased as production gained, whereas the trend of prices was downward.



upon price rather than upon production. The trend of earnings reached a high point in 1906, then declined at a fairly uniform rate through 1913. In this decline the curve parallels the price curve, although the price curve reached a high in 1907. Production, on the other hand, after showing a slight decrease in 1907, started up and kept rising until the end of the period.

During the second cycle, the war period, the curves of earnings and prices continue to parallel each other closely. The curve for production kept moving upward during the first part of the period, reaching a high point in 1917. In 1917 the trends of both earnings and production started down, but the price curve went on to a new high figure in 1918 before declining. During this period all three curves moved in the same general direction.

Marked Change Occurs in 1921

Beginning with 1921, however, a marked change becomes apparent. Both earnings and production started an upswing in that year which continued without interruption through 1928-29. Prices, on the other hand,

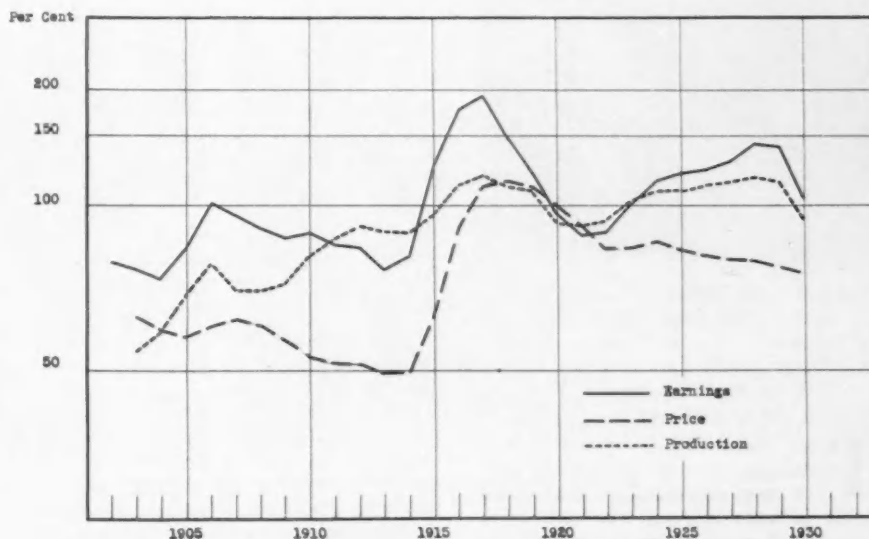
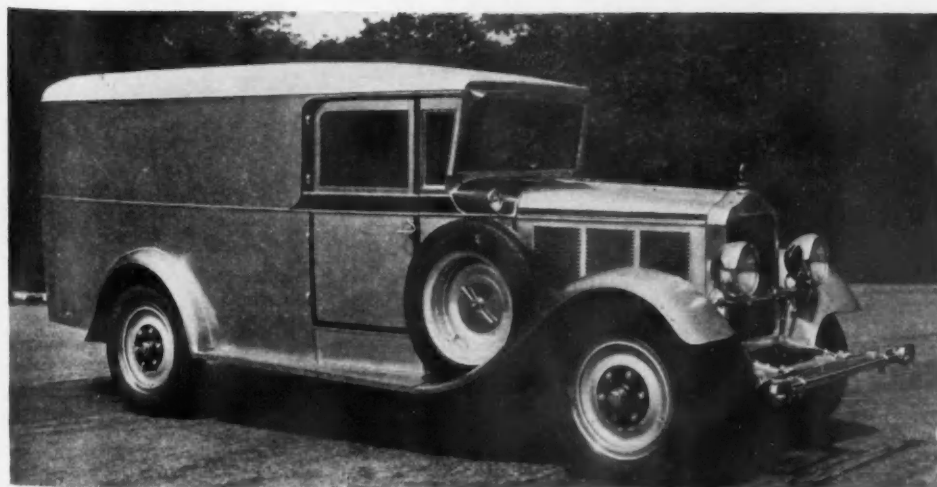


Chart II.—Earnings, price, and production of the United States Steel Corp. (Three-Year Moving Averages.)

after reaching a high in 1924 declined uniformly for the balance of the period. Here, for the first time, earnings increase in the face of declining prices. Even in the slump of 1930-31 prices played a minor role. Considering the actual figures, we find that the average price for 1931 was 11 per cent below that for 1929. Production declined 54 per cent while earnings fell off 84 per cent. Between 1923 and 1929, however, prices dropped even more, 12½ per cent, while earnings, supported by a rising level of production, increased 44 per cent.

These figures cannot explain why price, which exercised the major con-

trol over profits in the first period of our analysis, gave way to production in the last period. The explanation can probably be traced to the fact that the operations of the corporation were relatively stable at a high level after 1915. Whatever the reason, the fact remains that the ability of the corporation to maintain a high level of earnings depends entirely upon maintaining a high rate of operations. Whether steel prices are stabilized by some action on the part of the steel companies, or turn up through the action of general economic forces, the change in price will have little effect upon the earnings unless it is followed by a marked increase in production.



FENDERS, hood and body panels of this delivery truck are made of rustless steel. Enduro KA 2 chrome-nickel steel having a Tampico brush finish is used for the upper body panels and top of cowl and top of hood. The same steel is used below the belt molding or for the lower body panels and lower part of hood and for the fenders, but steel for these parts has a No. 1 finish. This gives the body a two-tone color effect. Auto body sheets are used for the roof, and other parts such as radiator shell and head lamps are made of steel usually used for those parts. The truck, built by the White Motor Co., Cleveland, is designed particularly for department store service.



Structural steel breakover towers, 100 ft. high, were built.

THE construction of the aerial tramway at Wheelwright, Ky., for the disposal of coal mine waste affords a good example of a large steel company making full use of structural steel in the building of towers and terminals on a major material-handling project. About 100 tons of steel went into the construction of the towers and terminals. In addition, approximately 75 tons of steel was used in the manufacture of machinery and ropes.

Because of rough country it was necessary to carry the tramway across two hollows on high towers, and other conditions were severe. A large hourly capacity, added to the fact of a heavy grade from the loading terminal to the first tower, imposed high stresses in all the equipment.

One of the requirements of design called for the least amount of labor consistent with dependable operation. The handling of irregular material and the resulting danger of stoppages in the flow made full automatic operation seem impractical. The tramway was therefore designed with many automatic features, but all under the direction and control of one man.

As the flow from the tippie is more or less intermittent, a 200-ton loading terminal bin was built to act as a reservoir and to be fed by means of a large inclined conveyor. Electric limit switches were arranged in this bin to prevent overflow or complete emptying. These interlocking switches provide for stopping the large conveyor when the bin is filled, and starting it again when the lower limit is reached. Automatic signal lights are placed in front of the operator so that he will be kept informed of the operation of the switches. Under the bin are two heavy apron feeders which

Inland Steel Co. Builds Aerial Tram

load the tramway buckets and which are push-button controlled. They are electrically connected to the bin limit switches so that they will be stopped automatically before emptying the bin. This arrangement is to prevent their running empty and being damaged by slate falling from the top of the bin on to the aprons.

The operation of the tramway is as follows: The grip on the tramway carrier as it enters the terminal is automatically released from the traction rope, and the carrier coasts toward the loading conveyors. The rails in the terminal are inclined, and the force of gravity is taken advantage of in handling the carriers through the terminal. In order to prevent a carrier from running into the one in front of it, mechanical stops are provided. There is one at each feeder to hold the carriers during the loading operation. One of these is released automatically, simultaneously with the dispatcher, and one is hand-operated. The carriers are stopped again at the dispatcher and held until the proper interval for each one to start out of the terminal. From this last position the carrier is released automatically, and the interval between carriers is controlled by the tramway itself. This spacing depends upon the capacity of the tramway, and may be regulated to suit any conditions. From this dispatcher the carrier coasts to the

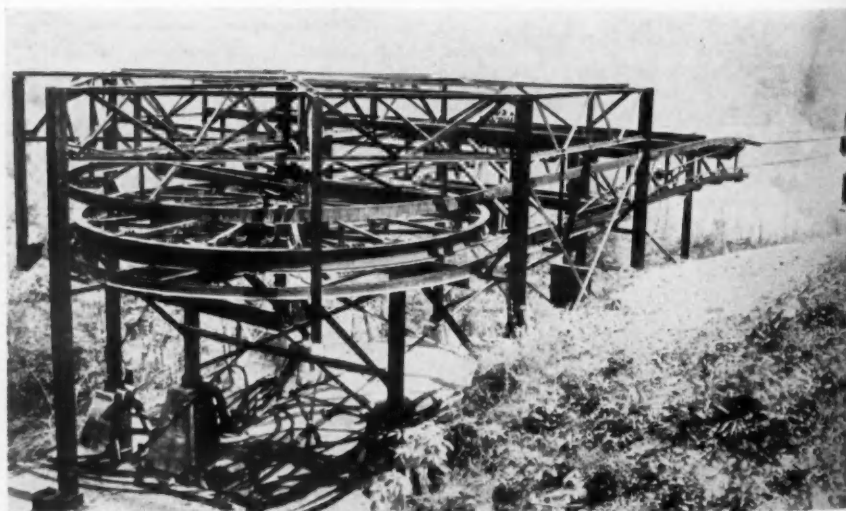
LAST year the Inland Steel Co., Chicago, remodeled and modernized its coal mining operations at Wheelwright, Ky., and an important part of the new construction was a semi-automatic aerial tramway which is used for the disposal of mine waste. This was designed by A. Leschen & Sons Rope Co., St. Louis, and was built by that company in association with the St. Louis Structural Steel Co., East St. Louis, Ill. The Link-Belt Co., Chicago, built the tippie, coal conveyor and rotary dumps.



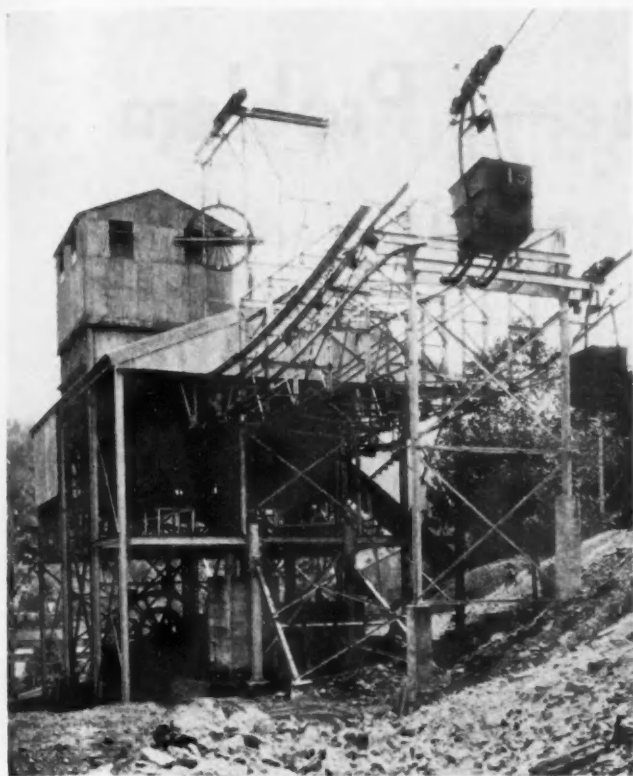
attacher where the grip is automatically clamped to the traction rope.

Vertical Tension Equipment

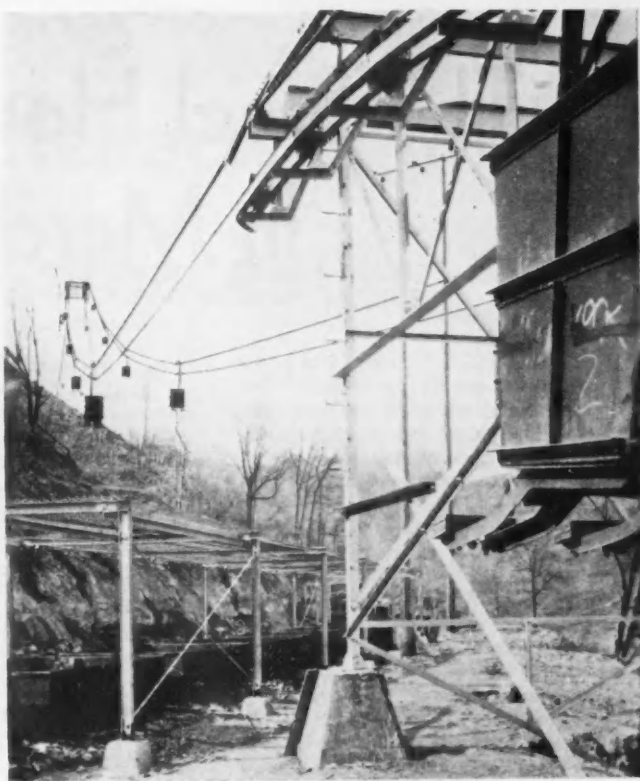
The level at which these loading operations are performed is several feet above the ground, and so the driving machinery is mounted conveniently below the operator on heavy concrete foundations. The grip wheel is 10 ft. in diameter, and attached to it is a large spur gear driven through a Falk double-reduction herringbone reducer. This reducer is direct-con-



The steel sheave at the outer end of the line is 17½ ft. in diameter.



This shows a carrier entering the loading terminal. Note vertical tensioning equipment.



Where the tramway crosses the mine car track near the loading terminal a sturdy protecting net was provided.

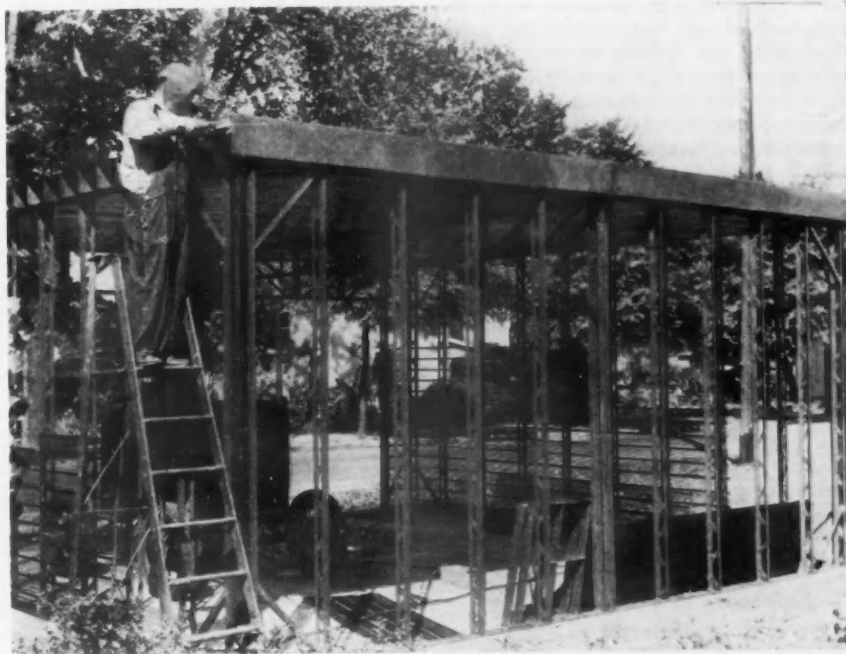
nected to a G. E. 75-hp. motor. A thruster brake for general use, and a safety device to prevent the tramway from running backward, are also a part of this unit. As the carriers pass around the outer terminal without detaching from the traction rope, the traction rope tension must be placed at the loading end. The ground area on which to build this terminal was limited, so this tensioning equipment had to be installed vertically. The traction rope is deflected upward and around the tension sheave. This sheave and counterweight are supported in a tower, and move upward and downward as the loading varies.

The track ropes are supported by two towers, each approximately 100 ft. high. The passage of the carriers over the vertical angle formed at these towers is handled smoothly on curved rails of long radius. At the outer end of the line a 17½-ft. diameter structural steel sheave is provided to take the carriers around the 180-deg. turn without their being detached from the traction rope. The track cables are anchored in concrete blocks at this end of the line, and the proper tension is applied at the loading end by means of freely hanging concrete weights. The carriers each hold approximately 30 cu. ft. of material and can be dumped at any point between the first tower and the outer terminal. The bottoms are hinged so that the waste material is dropped vertically whenever the latches are tripped. Counterweights insure automatic closing. The four cast steel, turned groove carrier wheels are mounted in Timken roller bearings, and this same

type of bearing is used in all the traction rope guide rollers at the towers and terminals. Each carrier is equipped with the Leschen heavy-duty friction grip.

Besides the low cost of operation

of this material-handling equipment, it affords a means of removing the slate and other waste a considerable distance from the camp and thus does away with most of the disagreeable fumes from the burning slate.



WELDED LIGHT STEEL FOR BUILDING CONSTRUCTION

ILLUSTRATIVE of a system of steel construction intended for wide application in the building of homes, the Hobart Brothers Co., Troy, Ohio, is erecting at Troy a two-car residential type garage, 18 x 20 ft. in plan. It has a frame of light angles, welded to form channels and spaced 2 ft. apart, with welds top and bottom to a steel strip. The roof is flat, made up of No. 16 gage Armco sheet steel formed and welded to produce a cellular or box-type construction; the cells are 6 x 10 in. Stucco applied to the metal lath forms the exterior.

The Steel House—a Problem In Merchandising

By **ROBERT TAPPAN**
Architect, 445 West Twenty-Third
Street, New York

THROUGHOUT the United States there are over 30,000 retail distributors of building materials. They deal in lumber, brick, cement, plaster, glass, hardware, paint and numerous other necessary products for house builders. It is their function to make contacts with the small builder and to make up a bill of materials out of their stock to meet the requirements of their customers, and to deliver these materials to the building site as the builder may need them. If these 30,000 dealers each carried a stock of standard structural steel shapes of suitable sizes for residential construction, the national market for structural steel for homes might, in time, grow to staggering proportions. But before this object can be realized there are certain steps that must be taken. The small builder must be educated to appreciate the advantages of steel, not necessarily as a substitute for lumber, brick and cement, but as a valuable addition to these products.

From the viewpoint of the average home builder, structural steel is an unknown quantity. Centuries of use have given the older products an enormous advantage over structural steel that only an intensive educational campaign can hope to overcome. It should be the function of the American Iron and Steel Institute and the American Institute of Steel Construction to tackle this problem in an effort to show the public just where and how structural steel may be effectively employed in house building.

Until this educational work is undertaken, little or no progress can be hoped for. House construction methods are hard to change, but they must be changed before structural steel can be economically utilized. The age-old practice of handicraft production in the open, with its scandalous waste of time, skilled labor and materials, must be combated by scientific engineering intelligence, sponsored by the proper representatives of the steel industry.

Economies in Time, Labor and Material

Economic construction depends no longer upon medieval handicraft methods. The use of structural steel has eliminated the time racket, by providing a skeleton frame work upon which many trades may busy themselves simultaneously. If the steel industry, acting through its proper rep-

resentatives, should show the house builder how to overcome the time racket by the intelligent use of steel skeleton construction, it would prepare the path for a future national distribution of structural steel of widespread proportions.

Individual experiment has already demonstrated that the same time-saving economies that have been achieved in office building construction may just as readily be applied to house building. According to published figures it requires over 2000 labor hours to construct an average mail-order wooden house. Generally speaking, 50 per cent of the cost of any typical small house is charged to field labor. If this percentage were reduced the saving could be applied to better building materials and to better household equipment.

In other words, a scientifically designed, steel-framed cottage might show enough saving in field labor

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THE steel industry, Mr. Tappan holds, has a definite, though relatively simple and inexpensive, job to do if it wishes to increase the use of steel in house construction. It must reach the 30,000 dealers now regularly serving the building trades, but not with any idea of bringing about a revolution in home construction methods. Its purpose, rather, should be to supply tangible information as to how steel may be utilized as a valuable addition to present acceptable materials, with special emphasis on savings in time and labor. The responsibility for such a promotional campaign, in the author's opinion, rests squarely on the shoulders of established associations of steel makers and fabricators.

The current article is the twelfth in our general series devoted to Modern Merchandising and Marketing in the Metal-Working Industry.

hours to do more than pay for itself. A steel skeleton for a typical six-room cottage can be assembled easily in less than 25 labor hours. As soon as it is up, a half dozen different trades may start work at the same time, without waiting for each to complete in part his portion of the job. Modern houses are so full of complicated devices that each construction operation resembles a miniature tower of Babel. Fifty years ago a cottage was a mere shell; now it is a stationary engine. The steel skeleton can help this situation.

Must Drop the Patented House Idea

In dealing with new building products it is always a temptation to cloud the issue by attempting to exploit them as patented novelties. This seems to be an unavoidable step in the introduction of steel to the house building public. Inventors, fired by enthusiasm for their own novel ideas, overlook the basic problems of custom, tradition, transportation and merchandising. Houses require local assembly. They cannot be economically pre-manufactured in one place and assembled individually in another, without involving established trade channels. It should be the object of the steel industry to introduce the steel skeleton idea for homes on its merits as a time saver, but not as a patented novelty.

Steel Will Come by Evolution, Not Revolution

The proper function of the steel industry should be to foster an evolution in home building methods, not a revolution. It should be neither difficult nor expensive to prepare scientific designs for steel-framed houses that could be used to illustrate to the building world the real advantages of steel skeleton construction, not to the exclusion of other products of recognized usefulness, but as a means of lowering excessive field labor costs. A graphic educational campaign would encourage local builders to use steel by showing them how to adapt it to their established customs and building experience.

There are certain types of small structures that are in universal demand. Careful study reveals the fact that these structures may readily be reduced to a few simple basic plans. These plans may be in turn used for
(Continued on Advertising Page 10)

An Insulating Refractory for Heating Furnaces

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THE importance of a light, low-conductivity refractory for furnace structures is apparent when it is considered that the heat absorbed by the walls, floor, and roof of a furnace does no useful work, and that the fuel required to heat a firebrick furnace structure may easily be more than 30 per cent of the total required per cycle. This is especially true of the intermittently operated smaller steel-heating or heat treating furnaces, which are operated ordinarily only during the working day.

To meet these and other requirements, a new refractory, combining low thermal conductivity, low heat-storage capacity, refractoriness and light weight, has been developed by the Babcock & Wilcox Co., New York.

This refractory, which has been named No. 80 Insulating Firebrick, is claimed to remove the necessity of building composite furnace walls, lined with firebrick and backed with insulation, which are not only thick and heavy, but also are high in heat storage capacity.

Since the greatest saving resulting from the use of the new refractory is from the standpoint of heat-storage, it would appear that continuous furnaces do not offer much opportunity for fuel saving by the use of this brick. However, though the usual schedule for such furnaces is five days per week and 50 weeks per year, it is reported that actual installations have proved the economy of its use with but 50 shut-downs per year. Under present operating conditions, however, the number of shut-downs of continuous furnaces per year is, in some cases, two and three times that figure.

Advantages in Stress Relieving Furnaces

Of the larger furnaces, stress-relieving or annealing furnaces offer the greatest possibility for fuel saving by being so constructed that they will have the lowest possible heat-storage capacity. In the operation of such furnaces, the charge to be heated is placed cold in the furnace, and the temperature is raised to the proper stress-relieving or annealing point, at which it is held for the requisite length of time. The charge is then cooled to a temperature at which it may be removed, and the cycle is re-

A NEW insulating refractory, for which some interesting claims are made, has recently been put on the market. It is said to combine low thermal conductivity and low heat-storage capacity with refractoriness and light weight. This article sets forth the properties and the advantages claimed for this new material in heating, heat-treating and other furnaces.

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peated with the next charge. Since the furnace structure, as well as the charge, must be heated during each cycle, any reduction in the amount of heat absorbed by the structure results in a lower consumption of fuel per ton of stock heated. The ideal furnace enclosure, therefore, is one with minimum thickness and weight, and with maximum resistance to heat conduction.

The curves in the accompanying chart show the comparative insulating properties of the new firebrick and four other standard insulators. Although two of the others are lower in thermal conductivity at low temperatures than the new insulating firebrick, they can be used only for temperatures up to 1600 deg. The other two reach their maximum use limit at 2200 to 2500 deg., and then only when protected by a firebrick lining. The B & W insulating firebrick has a fusion point of 3190 deg.,

and may be used at temperatures up to 2850 deg. without shrinkage.

Porosity of the Brick Is 80 Per Cent

This new product weighs only about 2 lb. per standard 9-in. brick, whereas a standard firebrick weighs about 7.3 lb. It is also of interest that the new insulating firebrick may be ground to accurate size, drilled, sawed, or turned on a lathe by ordinary wood-working tools. The new bricks are made of kaolin porosified to approximately 80 per cent. It is stated that the uniform distribution and the minuteness of the pores of the new insulator are almost wholly responsible for its unusual properties.

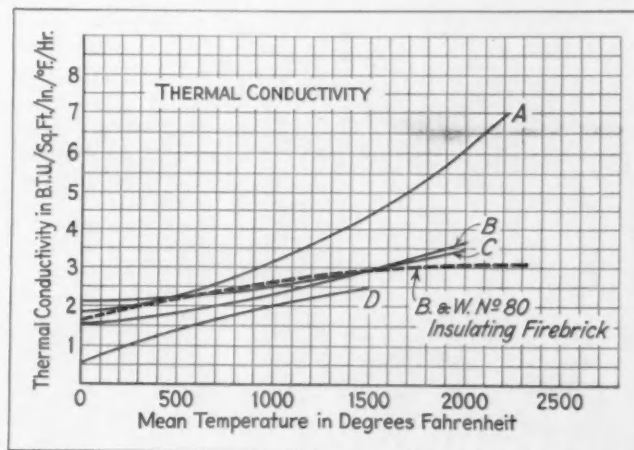
It may be exposed directly to furnace gases without undergoing any change up to a temperature of 2850 deg. F. Above this temperature, there is some slight surface checking on the initial working cycle; this shrinkage, however, may be remedied by the application of a coating of high-temperature mortar. Furnace walls may be built of the B & W insulating firebrick to the same height as firebrick walls for the same temperature exposure. The great porosity results in a certain structural flexibility that permits internal adjustments when the material is subjected to rapid temperature changes.

Resistance to Flow of Heat

Since this new insulating firebrick weighs only about one-fourth that of standard fireclay brick, the substituti-

(Continued on Advertising Page 10)

COMPARATIVE
thermal conductivity curves of the new insulating firebrick and other insulators.



Atomic Hydrogen Welding Solves Heat

THE welding of No. 16 gage tubing, $\frac{3}{4}$ in. in diameter, into a 1-in. thick tube sheet has been readily accomplished by atomic hydrogen welding at the plant of the Whitlock Coil Pipe Co., Hartford, Conn.

Fig. 1 shows one end of a carbon-bisulphide cooler. The 110 tube ends, were rolled into the tube sheet and then atomic hydrogen welded. Upon completion, the cooler was subjected to a test pressure of 150 lb. per sq. in., which all welds successfully withstood, including the flange rings to which the tube sheets are bolted. These flange rings were electric arc welded to the shell with G-E type L electrode and General Electric arc welding machines.

Plain expanded joints are suitable and are used extensively on the great majority of heat exchangers even when there is occasional heating and cooling and, in some services, even where the exchanger is subject to frequent alternate heating and cooling. Use of supplementary welding, however, is desirable in certain other cases

By **M. W. BREWSTER**
Arc Welding Specialist
General Electric Co.
New Haven, Conn.

such as in multi-tubular heat exchangers operating under particularly severe conditions as to temperature changes and pressures; also, where it is necessary to handle liquids or gases which tend to pass through extremely minute openings and in cases where the results of even the slightest leakage or seepage would be particularly serious.

Welding Performed Economically

The Whitlock Coil Pipe Co. has had large electric arc welding and gas welding facilities for years. Several years ago they added atomic hydrogen welding equipment. In the case of the carbon-bisulphide cooler illustrated, a moment's consideration of the relative heat values involved for bringing the edge of the hole in the heavy tube sheet to fusing temperature without

projected slightly from the face of the tube sheet so that, as this edge was melted down to the level of the sheet, fusion of this metal with that of tube sheet was obtained. At the same time the unfused tube surface and the surface of the tube sheet adjacent to the molten metal and the molten metal itself were protected from atmospheric oxygen and nitrogen by the protecting shield of hydrogen surrounding the atomic flame.

A description of the atomic hydrogen welding flame will explain how the above welding conditions are obtained. Fig. 2 shows an atomic hydrogen welding electrode holder. The two tungsten electrodes are shown touching; when welding, these are separated and an arc is maintained between them. The operator strikes and controls the arc by means of the grip lever on the handle which moves one of the electrodes. Electric energy is supplied through a twin conductor cable entering the rear of the handle. Hydrogen enters at this same location through a flexible hose, passes through tubes in the holder, out through an-

FIG. 3—Atomic hydrogen welding equipment including panel, electrode holder, push-button station, hydrogen tank, reducing valve and gages.

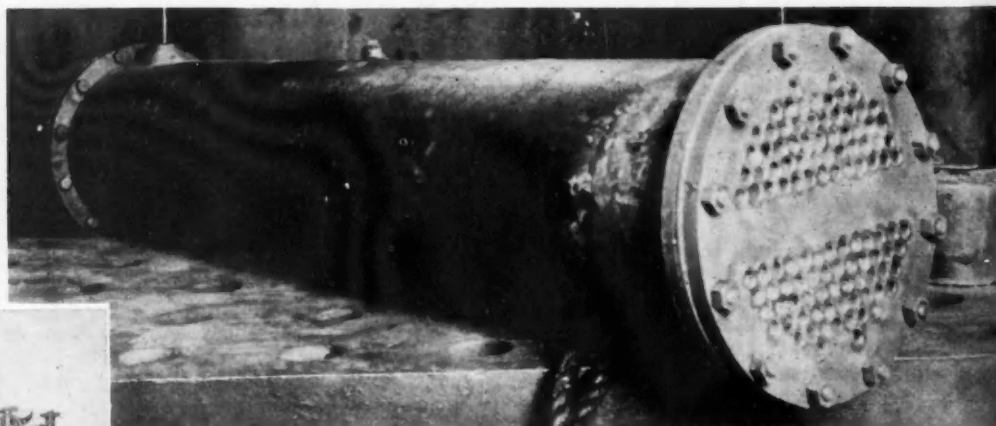
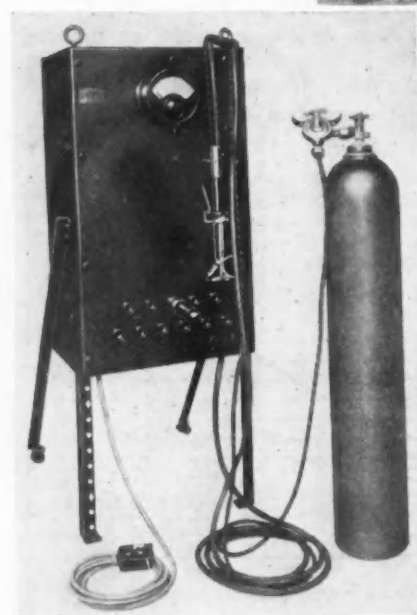


FIG. 1—Carbon-bisulphide cooler with 110 tube ends, which were rolled into the tube sheet and then atomic hydrogen welded. The flange rings were arc welded to the shell. Upon completion, the cooler was subjected to a test of 150 lb. per sq. in., all welds withstood the test successfully.

destroying the comparatively thin wall of the tube makes obvious the practical difficulties of applying either electric arc welding or gas welding. Familiarity with the atomic hydrogen process clearly indicated the proper solution.

The welding of the tubes proceeded at a rapid rate with the process and technique employed. The job was, therefore, successful from the standpoint of cost as well as of results. Contributing to this was the fact that no filler rod was required. The tubes

nular openings around the electrodes and through the arc.

Atomic Flame Explained

An analogy will help explain the atomic flame itself. In a steam heating system heat energy generally obtained from burning coal or oil is supplied to the water in the boiler. This heat vaporizes the water, or, in other words, supplies the latent heat of vaporization to change the water into steam. The steam is circulated in the house radiators where it con-

Heat Exchange Equipment Problem

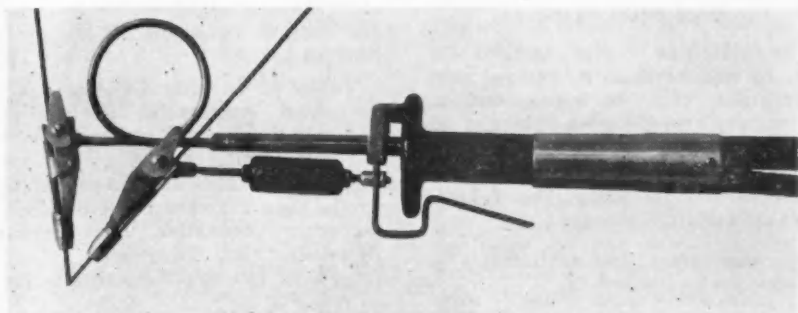


FIG. 2—When welding, the two tungsten electrodes of the atomic-hydrogen torch are separated and an arc is maintained between them. The operator strikes and controls the arc by means of the grip lever on the handle, which moves one of the electrodes.

denses, and, in so doing, gives up its latent heat which in turn warms the room. In other words, we use the heat energy resulting from a change of state, that is, from water as a liquid to water vapor or steam, for a useful purpose.

In atomic hydrogen welding the hydrogen gas made up of molecules, each containing two atoms, passes through the arc. Energy is supplied by the arc just as heat energy was supplied by fuel combustion, to the water. In the boiler the water was changed to steam; in the case of hydrogen the molecules of hydrogen are split apart into their two component atoms with the absorption of energy from the arc. Both cases represent the change of a substance from one state to another—water to steam—hydrogen molecules to hydrogen atoms.

This hydrogen in the atomic state forms a small fan-shaped flame ex-

tending downward about $\frac{3}{8}$ in. from the tips of the electrode. As this atomic hydrogen reconverts to molecular hydrogen it liberates heat which may be compared to steam in a radiator condensing to water and heating our room. The heat liberated by the hydrogen reaction described above is used to fuse the metal in making a weld.

Although the temperature of the atomic flame is high, the amount of heat available for welding can be controlled so that very light or relatively heavy welding can be done at will. In the steam boiler we can burn the coal at a more rapid rate, make more steam and have more heat in our rooms. In atomic hydrogen welding we can control the amount of current through the arc existing between the two tungsten electrodes and have more or less heat available as desired for our welding operation.

This current is adjusted by inserting the plug, shown on the control panel in Fig. 3, in the socket that gives the desired current for the job at hand.

In welding, hydrogen gas is emitted from the annular openings, somewhat in excess of that required to form atomic hydrogen. This excess hydrogen forms a shield around the atomic flame of atomic hydrogen and the molten metal, thus preventing air from coming in contact with the molten metal and adjacent surfaces of the parent metal. The process, therefore, is one in which the welding heat is present in concentrated form within a highly reducing atmosphere. This process has enabled the Whitlock Coil Pipe Co. to weld successfully thin tubes to the thick headers, and to do other jobs which are impractical or even impossible by other welding processes.

Liquid Baths For Heat Treating

Author's Correction

In the final installment of my series on the above subject in the Feb. 9 issue of *THE IRON AGE*, the use of protecting thimble and collar, as described in Fig. 5 on page 232, is covered by patents granted to Mr. A. E. Bellis, of the Bellis Heat Treating Co., Branford, Conn. Credit should have been given to Mr. Bellis and his company in mentioning this item.

*W. Paul Eddy, Jr., Metallurgist,
General Motors Co.,
Pontiac, Mich.*

▲ ▲ ▲
A 45-ton gas-electric locomotive was recently built for the United States Navy by the Atlas Car & Mfg. Co., Cleveland, for use at the new airship hangar at Sunnyvale, Cal. It is powered by two 170-hp. gas engines, which drive electric generators, which in turn supply current for electric propulsion motors. All functions of control are accomplished electrically including separate gas engine acceleration. It is essentially a switching locomotive with possibilities of application to industrial haulage requirements.
▼ ▼ ▼



Iron and Steel Standards Proposed at Testing Materials Meeting

PRODUCERS and consumers met in committee groups in New York last week to further the preparation of specifications for engineering materials. The occasion was another of the gatherings that have been held every March for some years by the American Society for Testing Materials. Out of the numerous meetings—and there were between 115 and 120, most of them in the mornings, afternoons and evenings of Tuesday, Wednesday and Thursday — came recommendations looking to establishing standards in the way of material specifications, methods of testing and recommended practices as to use. The society, in its annual meeting in Chicago in the third week of June, will take up the reports of these committees. In spite of general business conditions, the groups were in general well represented. Private dining rooms and parlors of the Hotel New Yorker provided for the simultaneous sessions.

In the field of ferrous metals, there was trail blazing in steps to round out specifications for alloy steel castings and a considerable pooling of views regarding methods to determine the behavior of ferrous metals at elevated temperatures, including the requirements of piping, fittings and the like for high-temperature service. And among the committee meetings was one of the joint research committee of the American Society of Mechanical Engineers and the American Society for Testing Materials on the effect of temperature on the properties of metals, with Chairman H. J. French, International Nickel Co., presiding; this committee made progress in the writing of a code for short-term high-temperature tensile tests as well as tests for creep.

Corrosion Conference in September

The interests devoted to corrosion problems, meeting as Committee A-5, expressed direct interest in a conference of international scope, on corrosion, that is to be held in Chicago in September under the auspices of the American Electrochemical Society. The committee's chairman was empowered to arrange for cooperation in this meeting.

Brief reports were made of the corrosion indications at the testing stations at Portsmouth, N. H., and Key West, Fla.; also of an outline of tests to be conducted of No. 22 gage sheets made of low-phosphorus and high-phosphorus open-hearth steels, with the samples to be cut from the center of sheets. A brief informal discussion of user specifications calling for zinc-treated material as differentiated from zinc-coated material was inconclusive as to whether or not there

was any particular difference in the terms.

Proposed Steel Standards

The committee on steel, A-1, on the basis of reports from its several subcommittees, voted to recommend to the society's meeting in Chicago in June the passing on to standard from the tentative stage of a number of specifications, including the following:

Soft steel track spikes, featuring a minimum carbon content.

Tie plates allowing for a copper limit. Structural steel for buildings providing that punched material up to 7/16 in. in thickness may be of Bessemer steel.

Structural silicon steel with a revision regarding the test specimen and the elongation test requirement.

Structural rivet steel.

Heat-treated carbon-steel helical springs for railroad use, which specification has the approval of the American Railway Association.

Austenitic manganese steel castings, those that are referred to as Hadfield's manganese steel, stipulating a minimum of 10 per cent for the manganese and a maximum of 0.05 per cent for the sulphur.

Lap-welded and seamless boiler tubes.

Plates for forging of both the flange and structural quality.

Among the specifications that are to be recommended as tentative are the following: Heat-treated carbon-steel elliptical springs for railroad use; alloy castings for structural work.

There was also an indication that by the time of the annual meeting a tentative specification will be ready for weld filler metal; the subcommittee having the work in charge has been collaborating with the American Welding Society.

A tentative specification for structural steel of a grade classed as for special work of heavy character may be presented, depending apparently on the outcome of a conference with the American Railway Engineering Association.

It was voted to continue as tentative the specification for alloy steel forgings for locomotives, this having now been modified so that forgings to meet 80,000 lb. tensile strength must have a yield point of 55,000 lb. per sq. in., and those for 90,000-lb. service are to have a yield point of 58,000 lb.

The proposal to offer as standard the existing tentative specification for carbon-steel forgings for locomotives was left for further committee action in the interval before the June meeting. It appears that the American Railway Association has another specification favored by some of the railroad interests that calls for microscopic and macroscopic tests and

specifies the limits of the residual alloys, etc.

The subcommittee on pipe recommended that in the case of grade A seamless pipe the required percentage of elongation in the 2-in. test specimen be put at 30 per cent, being a reduction from the present 40 per cent. Pipe for high-temperature service was included in this recommendation. The American Petroleum Institute is favorable to the 30 per cent factor.

Tables of variations in the size for hot-rolled commercial quality bars and cold-finished bar steels and shafting will be offered at the June meeting. Such tables have been compiled by the Cold Finished Steel Bar Manufacturers Association. Shafting specifications, also, have been extended from 6 in. to cover diameters as large as 8 in.

In marking boiler and firebox steel, stenciling instead of stamping is stipulated. Changes have also been made in the procedure for homogeneity tests, in recognition of the increased thicknesses in which plates are now obtainable, whereas very thick plates were not a commodity when the existing specifications were written.

In specifications covering testing, steps were taken to provide for hydraulic testing machines which cannot satisfy the stipulation that the yield strength is indicated by the "drop of the beam," seeing that such machines have no such apparatus. To meet the meticulous inspector who might otherwise demand a drop of the beam test, some such clause as "halt of the load indicating pointer on the gage of the testing machine" is to be inserted, thus to keep the specification in step with the developments in testing equipment.

It was voted to drop specification A-22-21, on cold-rolled steel axles, as no longer of value, though admittedly having served a useful purpose in its time.

Under the proposed tentative specifications for alloy-steel castings three classes of castings will be provided for for applications at mechanical stress where no high temperatures prevail: A, full annealed; B, normalized, and C, liquid quenched. Under Class A, two grades are specified: 75,000 lb. per sq. in. tensile and 85,000 lb. per sq. in. tensile. Under Class B, there are three grades: 85,000, 90,000 and 100,000-lb. strength. Three grades under Class C require tensile strengths of 90,000, 120,000 and 150,000 lb. per sq. in. These specifications were prepared by a subgroup under the chairmanship of J. H. Hall, technical assistant to president, Taylor-Wharton Iron & Steel Co.

Actions Taken on Wrought Iron

Committee A-2 on wrought iron recommended that revisions in the specifications for staybolt, engine-
(Concluded on Advertising Page 8)

Steel Corporation's Output in 1932 Lowest in Its History

Total Production of Finished Materials Represents a Decline of 10,000,000 Tons from Five-Year Average

THE United States Steel Corp., in its pamphlet report for 1932, states that the output of finished steel products of its subsidiary companies in 1932 was the lowest of any year since its organization in 1901. The year's output was only 18.3 per cent of the finished product capacity and reached the extremely low level of 13.6 per cent in August. There was an improvement during September and October, but a decline in the final two months of the year, with a December average of 14.4 per cent.

Shipments of rolled and finished steel products in the year totaled 3,974,062 tons, compared with 7,676,744 tons in 1931, a decrease of 48 per cent, or approximately the same as the

decrease for the entire steel industry. The decline from the 1929 total of 11,260,293 tons was 74 per cent. Last year's export shipments totaled 232,255 tons, a decrease of 282,130 tons, or 55 per cent, compared with 1931, and a decrease of 974,972 tons compared with 1929.

The corporation reports that further drastic economies, following those instituted in 1931, were made in all controllable expenses. Many plants were shut down entirely. In addition to the 15 per cent reduction in salaries and wages of all employees, effective May 16, 1932, the number of employees at administrative headquarters was reduced and many employees were placed on part-time service.

The decline in production during last year as compared with the average annual production during the five years ended Dec. 31, 1930, was approximately 10,000,000 tons, or 74 per cent. As of Jan. 1, 1933, the rated annual capacity of the subsidiary companies of the corporation was as follows:

Pig iron and ferromanganese.....21,108,900 tons
Steel ingots and castings.....27,341,900 tons
Finished steel products for sale.....19,269,500 tons

The average prices received for finished products were somewhat lower than the corresponding prices received in 1931. Calculated on the same weighted basis for both years the reduction in the average price received in 1932 in domestic shipments was \$2.28 a ton, and compared with the average price received in 1929, \$8.74 a ton. On export shipments the average reduction per ton in 1932, as compared with the preceding year was \$7.46 a ton, and compared with 1929, \$10.08 a ton. The reduction in the average price received for both classes of shipments in 1932, as compared with 1931 was \$2.58 a ton, and compared with 1929, a reduction of \$8.82 a ton.

The money value of business transacted during 1932 was \$357,201,705, compared with \$729,377,467 in 1931. These receipts are inclusive of inter-company sales and gross revenue of subsidiary transportation companies received from both outside shippers and from subsidiary companies of the corporation.

During the year the Steel Corporation expended \$28,279,593 for ordinary repairs and maintenance, blast furnace and coke oven relinings and extraordinary replacements, compared with \$59,461,294 in 1931. The total amount expended and appropriated from earnings for maintenance, depletion, depreciation and obsolescence of investment in tangible property was \$69,432,417, compared with \$107,737,302 in 1931.

Total taxes paid last year were \$31,942,415, equal to more than \$8 on every ton of rolled and finished steel produced.

Inventories at the close of last year valued at \$258,354,253, compared with \$302,599,748 at the end of the preceding year, a reduction of \$44,245,495 during the year.

Of a total working force of 158,032, only 18,938 were employed full time by the corporation last year. The number working part-time was 139,094. The total number of persons employed last year was only 68 per cent of the normal working force, which means the number required to operate all departments at practically full capacity. Through the year the corporation alternated work among its employees, thereby giving part-time employment to approximately 75,000 more persons than would have been required if all the employees who were needed had been given full-time employment. The total payroll for the year was \$133,912,809, compared with \$266,871,413

(Concluded on Advertising Page 8)

PRODUCTION OF RAW, SEMI-FINISHED AND FINISHED PRODUCTS BY SUBSIDIARY COMPANIES OF THE UNITED STATES STEEL CORPN. IN 1932 AND 1931.

Products	1932 Tons	1931 Tons	1932 Decrease Tons Per cent.
Ores Mined:			
In the Lake Superior Region (iron ore).....	2,759,075	11,725,480	8,966,405 76.5
In the Southern Region—Alabama (iron ore).....	819,299	1,762,749	943,450 53.5
In Brazil, S. A. (manganese ore).....	25,829	97,328	71,499 73.5
In Tennessee (zinc ore).....	12,116	15,159	3,043 20.1
Total.....	3,616,319	13,600,716	9,984,397 73.4
Limestone Quarried—Includes dolomite, cement rock, shale and fluorspar.....	3,203,029	7,673,718	4,470,689 58.3
Coal Mined:			
For use in the manufacture of coke.....	4,271,542	10,570,187*	6,298,645 59.6
For steam, gas and all other purposes.....	2,775,228	5,005,260*	2,230,032 44.6
Total.....	7,046,770	15,575,447*	8,528,677 54.8
Coke Manufactured:			
In bee-hive ovens.....	1,644	15,588	13,944 89.5
In by-product ovens.....	2,964,839	7,025,244	4,060,405 57.8
Total.....	2,966,483	7,040,832	4,074,349 57.9
Blast Furnace Production:			
Pig Iron.....	3,070,119	6,928,630	3,858,511 55.7
Spiegel, Ferromanganese and Ferrosilicon.....	52,811	92,877	40,066 43.1
Total.....	3,122,930	7,021,507	3,898,577 55.5
Steel Ingot Production:			
Bessemer ingots.....	1,084,102	1,849,280	765,178 41.4
Open-hearth ingots.....	3,845,134	8,233,118	4,387,984 53.3
Total.....	4,929,236	10,082,398	5,153,162 51.1
Rolled and Finished Steel Products for Sale:			
Steel rails (heavy and light T and girder).....	187,560	596,132	408,572 68.5
Blooms, billets, slabs, sheet and tinplate bars.....	401,407	568,948	167,541 29.4
Plates.....	157,106	601,714	444,608 73.9
Heavy structural shapes.....	240,208	563,886	323,678 57.4
Merchant bars, hoops, skelp, light shapes, etc.....	687,526	1,383,267	695,741 50.3
Tubing and pipe.....	233,094	677,619	444,525 65.6
Wire rods.....	69,774	128,842	59,068 45.9
Wire and wire products.....	495,523	778,883	283,360 36.4
Sheets (black and galvanized) and tinplates.....	662,394	1,069,901	407,507 38.1
Finished structural work.....	268,501	444,233	175,732 39.6
Angle splice bars and all other rail joints.....	49,029	118,711	69,682 58.7
Spikes, bolts, nuts and rivets.....	13,819	28,082	14,263 50.8
Axles.....	1,420	9,579	8,159 85.2
Steel carwheels.....	28,899	38,386	9,487 37.7
Sundry steel and iron products.....	100,212	187,814	87,602 46.6
Total.....	3,591,474	7,196,017	3,604,543 50.1
Miscellaneous Products:			
Zinc.....	5,422	27,528	22,106 80.3
Sulphate of iron.....	14,848	16,515	1,667 10.1
Fertilizer—basic slag.....	2,071	18,500	16,429 88.8
Ammonia (in sulphate equivalent).....	55,445	129,634	74,189 57.2
Benzol products.....	45,758	112,264	66,506 59.2
Gypsum.....	33,797	73,258	39,461 53.9
Portland cement (bbl.).....	7,113,300	15,050,996	7,937,696 52.7

*Revised

High-Speed Lathe Permits Full Use of New Cutting Tools

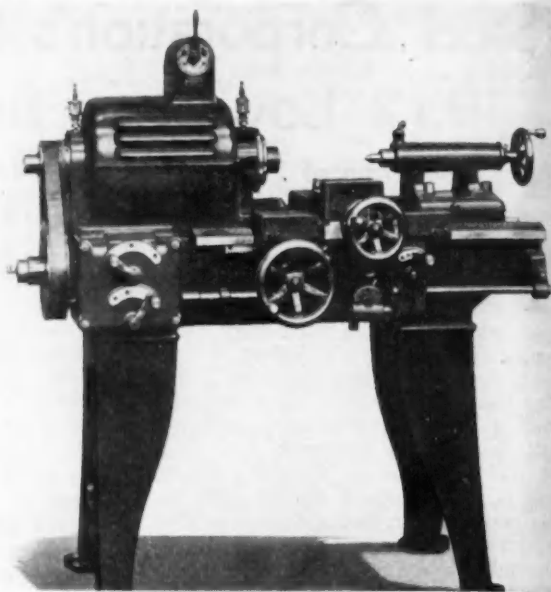
AN 11-in. high-speed motor head production lathe designed to utilize cemented carbide and other new tools to the fullest extent has been brought out by the R. K. LeBlond Machine Tool Co., Cincinnati. Ruggedness is a feature, the lathe being built to withstand strains of frequent starting and stopping at high speeds and the resultant shock from excessive tool impact. It is especially suited for turning small shafts, and for machining such materials as bronze, babbitt, bakelite, aluminum and white metal.

The multi-speed motor armature is mounted on the spindle, which rotates on precision ball bearings. The spindle arrangement is such that the end thrust is taken on the front bearing and the rear bearing is mounted so that it can float lengthwise in the head casting, a construction that prevents setting up of strains due to expansion. The head is of such rigid design that the spindle can be brought up to top speed, which is 3600 r.p.m., and stopped five times a minute. The spindle can be brought to top speed in 2 sec. and stopped in 1½ sec.

The bed of the lathe is unusually heavy. The rear carriage bearing is flat, and the front way is of improved "compensating-V" construction, which

HEADSTOCK design is such that the spindle can be brought up to 3600 r.p.m. and stopped five times a minute.

resists tool pressure in all directions. Both bed and carriage are nickel steel castings. The apron is of one-piece box construction with bearing brackets cast integral. All shafts and studs are supported on both ends to assure accurate alinement of gears. Gears are of drop forged steel, and the rack pinion is chrome-nickel steel, heat treated and hardened. Both cross and length feeds are controlled by a single positive feed clutch. An automatic length stop can be furnished which will stop the carriage within 0.002-0.003 in. Nine feeds are obtainable by use of two levers.



while in any operating speed the electrical circuit is immediately broken and cannot again be closed until the controller handle has been returned to its neutral position.

Forks or lifting prongs of various dimensions, crane booms with hooks and other load-handling accessories can be supplied. The overall height of the standard truck is 83 in. Special heights can be supplied or multi-lift features can be furnished to meet specific requirements of high stacking.

Develops Steel for Planer Knives

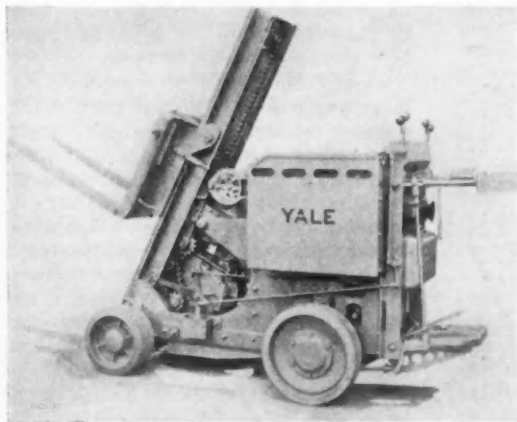
A STEEL "tougher and having better edge-holding qualities than high-speed steel" has been developed by Henry Disston & Sons, Inc., Philadelphia, for use in planer knives. In tests made by lumber mills, knives of "Dissteel," as the new product is known, are said to have remained sharp much longer than usual, in some cases giving from two to four times the service of high-speed steel.

Under the microscope the new steel shows a different structure from high-speed steel, although it contains alloys used in making that type of steel. It has the same hardness, but is said to offer greater resistance to the friction and abrasive action developed in planing when the knives strike the surface of the lumber at great speed. In addition to the greater wear resistance in thin planer knives, Dissteel is said to be sharpened more easily than high-speed steel, with the result that less time is required in grinding and fitting them. Planer knives made of the new material are now being offered.

Orders for fabricated steel plate rose to 8830 net tons in January from 5525 tons in December, according to reports received by the Bureau of the Census from 48 manufacturers.

High-Lift Tilting-Frame Industrial Truck

AN electric truck designed to pick up loose and bulky loads directly from the floor and transport them in a tilted position for warehouse stacking has been developed by the Yale & Towne Mfg. Co., Philadelphia. This truck, designated as the model K31A, is built in 4000 and 6000-lb. capacities. Maximum stability for the rated capacities and ability to negotiate minimum aisles are features.



Individual and interchangeable triple reduction spur geared power units are used for both hoisting and tilting. One tilts the upright frame either 4½ deg. forward or 25 deg. backward through two heavy-duty racks and driving pinions. The other unit elevates the vertical traveling carriage, by means of sprockets and two roller chains, either of which is capable of lifting the full load. The entire mechanism is protected from damage, should the lifting carriage meet an obstruction in its downward movement. Dual tilting and hoisting control handles are arranged on both sides of the operator's platform.

The drive mechanism on which this truck is spring suspended is the company's standard double-reduction spur gear unit, all gears in which are of drop-forged alloy steel carried on anti-friction bearings and completely inclosed in an oil-tight housing. The controller is of the interlocking type with four speeds forward and four speeds reverse. It is interlocked with the foot pedal so that should the brake be applied

Lathe Attachment Permits Turning and Boring Ovals and Other Shapes

THE Centrode Device, developed by the Monarch Machine Tool Co., Sidney, Ohio, for use on its 23-in. and larger model BB lathes, makes possible the turning, boring and facing shapes other than round—such as ovals, triangles, squares, hexagons and octagons and others having up to 16 sides, either flat, concave or convex.

By using the attachment in combination with an oval chuck, various elongated shapes can be obtained. When the attachment is used with a longitudinal forming device, operated by mechanical or electrical means, irregular contours of these shapes can be produced.

Arrangement of the Centrode Device, which is mounted on the cross-bridge of the lathe carriage and is positioned by means of the cross-feed handwheel, may be seen in the illustration. Power is taken through telescoping shaft A to shaft B through gear housing C, which is mounted on the carriage wing. From C the drive is through universal joint D to spiral bevel gears at E, which are mounted on a crankshaft at F. A connecting rod, at G, attached to the crankshaft, actuates the piston, or oscillating, slide H, which drives the oscillating arms I. Lower arm I actuates the intermediate slide J through pin and shoe K, the latter being held in position by adjusting screw L, which determines the amount of stroke on the Centrode attachment. Hand adjustment of the tool in relation to the work is provided by slide M, mounted on the intermediate slide J.

By means of the cross-feed screw, the unit can be positioned for diameters. A graduated scale for setting to a predetermined stroke is provided. The stroke capacity ranges from 0 to 2 in. An index plate facilitates setting

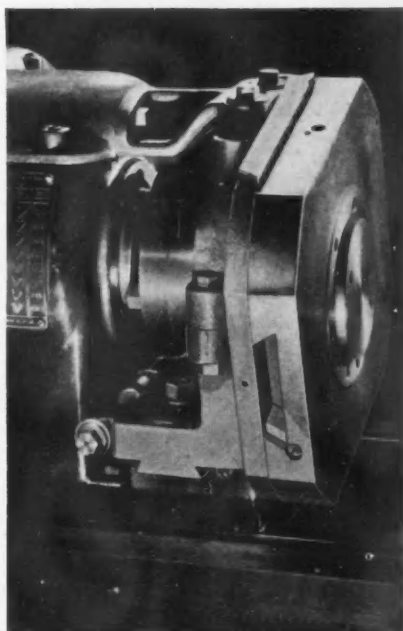
the number of flutes or tool actuations per revolution of the spindle in divisions from 1 to 16. In combination with a speed reducer or sub-headstock, that can be furnished, the device will produce up to 96 tool actuations to one revolution of the work.

Use of the Centrode Device is not confined to the Monarch-Keller automatic form turning machine. If the work is straight and without contour but is of such shape as triangular, square, hexagon, etc., as in die work, the Centrode Device eliminates use of cams, springs and weights.

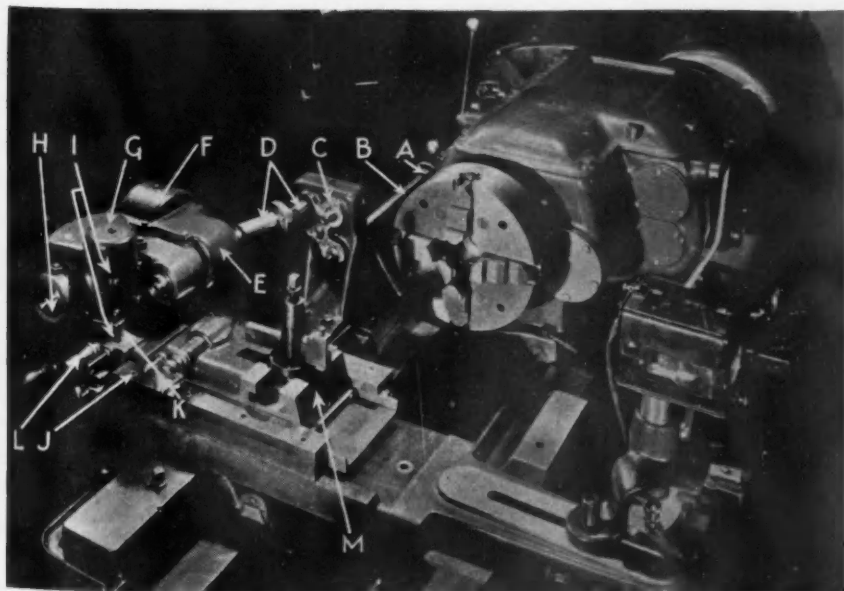
Oval chucks can be supplied for all



Elongated square turned and bored on Monarch lathe having oval chuck and centrode device. When put together, the two parts practically exclude light.



The oval chuck is shown above, and the centrode device, below. The latter can be applied to new Monarch lathes only.



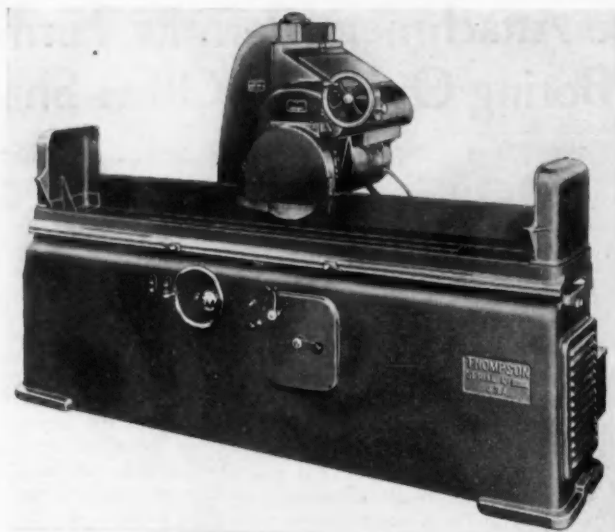
sizes of Monarch lathes, as well as for the Monarch-Keller form-turning machines. Applied to standard lathes, it will produce all classes of straight contour ovals; with the form-turning machine, the chuck is of special value in machining such work as oval-shaped bottle molds, dies, punches or spinning chucks for oval silverware and hollow ware.

When used on the standard lathe, the oval chuck will turn or bore ellipses of varying major and minor axis within the capacity of the chuck, which has a 2 in. throw—or a difference of 4 in. between major and minor axis.

The combination of oval chuck and Centrode Device on a standard lathe will produce innumerable shapes, and with the automatic form-turning machine, the combination makes possible an almost incalculable number of contours and shapes. Each fraction of an inch change in the stroke setting of the Centrode Device and each fractional change in setting of the oval chuck produces a different shape.

Formulas have been developed to facilitate calculating the correct setting of the Centrode Device and the setting of the oval chuck in order to produce a wide variety of shapes. A simple automatic stroke-changing device has been developed, whereby the same contour shapes can be turned and bored on work, the diameter of which is constantly changing.

Northern Equipment Co., Erie, Pa., announces a new design of differential pressure control valve known as the Copes type SS-2. Improvements provide for higher pressure drops than in the earlier design, without chatter or unbalance. Internal parts have also been simplified and made more rugged. It is made in $\frac{3}{4}$ to 6-in. sizes, inclusive, in the 250, 400 and 600-lb. pressure standards. The range of control is 10 to 35 lb. per sq. in. differential pressure. The valve will handle pressure drops up to 150 lb.



THE 6 x 18-in. hydraulic surface grinder at left is for tool-room use. The large machine above, the 12 x 60-in., has a large grinding wheel for grinding dies from which guide pins have not been removed. Control of both machines is from a central valve panel.

Fully-Hydraulic Surface Grinders

SURFACE grinding machines, operation of which is entirely hydraulic, have been brought out by the Thompson Grinder Co., Springfield, Ohio. Three sizes are built, namely, 6 x 12 x 18 in.; 8 x 12 x 24 in.; and 12 x 16 x 40 in.

The traversing speed of both the table and the wheel-head can be easily varied, and all operating functions are controlled from a central valve panel. Reversal of the table is accomplished by adjustable dogs. Reversal is without shock or dwell, and is with an accuracy that permits grinding parts having close interference on the ends.

Traverse of the grinding wheel-head can be either intermittent, at a variable rate, or continuous in either direction. The motor-on-spindle feature is said to eliminate vibration and deliver maximum power. The wheel spindle, a heat-treated chrome-nickel steel forging, is carried at the front by an adjustable bronze bearing and at the rear by precision ball bearings. Both intermittent and continuous hydraulic cross-feeds are provided for the head unit. Intermittent feeding is graduated in increments of 1/32 in. per reverse to 65 per cent of the wheel width. The head bracket is fitted with adjustable stop dogs for shoulder or slot grinding. By adjusting similar dogs, the wheel-head may be reversed automatically during its feeding movement. A manual feed is also provided for form or shoulder grinding.

The 6 x 12 x 18 in. grinders have automatic power cross-feed as an optional feature. They are intended for tool room use where unusual accuracy is required. Table speed is instantly

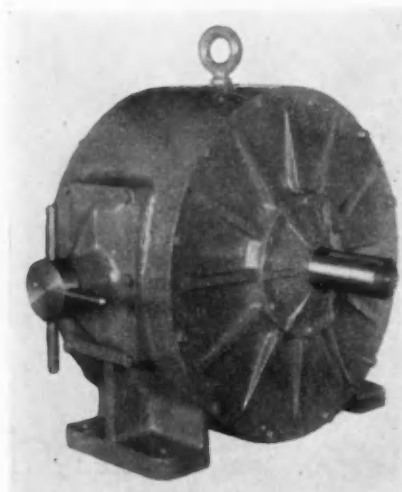
variable between 10 and 100 ft. per min. The operator's entire attention is devoted to one function, namely, cross feeding to his limit on the graduated handwheel. Hydraulic automatic cross feed can be supplied as an extra.

The 8 x 24-in. machine is adapted for both tool room and production use. In addition to the standard automatic

hydraulic intermittent and truing feeds the head may also be moved by means of a hand-wheel on the wheel-head bracket. The coolant tanks have sediment baffles which precipitate a large percentage of the grit before it enters the pump. The 12 x 60-in. grinder has a large diameter grinding wheel for grinding dies from which guide pins have not been removed. The wheel is driven by a 10-hp. motor, which is thoroughly protected from water and dust, and is fan ventilated.

Radial Piston Pumps for Machinery Application

A NEW line of hydraulic pumps and motors of the rotary radial piston type has been announced by the Northern Pump Co., Minneapolis. Capacities range from 1 to 200 gal. per min., and pressures up to 4000



lb. per sq. in. Volume of discharge can be changed to deliver any amount from zero to maximum capacity, and the discharge can be reversed without stopping the pump or changing the speed of rotation. Nitralloy parts are used throughout.

Features of these pump drives include sensitive control of speed by pump discharge regulation, automatic speed increase, smooth action due to hydraulic automatic control, maximum pressure with minimum speed and power consumption, freedom from fire hazard, and flexibility of design and application for special purposes. Applications include machine tools, presses, testing machines, rolling mill manipulators, stokers, ovens, furnace chargers, sheet and rod stretchers, and billet shears.

The unit illustrated is one of the No. 5000 series pumps, which are available with a complete line of automatic controls and semi-automatic valve mechanisms. All pumps incorporate balanced pressure design, whereby hydraulic forces are balanced to prevent heavy bearing loads at high pressures. The Nitralloy parts resist any wear that might result from dirty oil.

OFF THE ASSEMBLY LINE



Automobile Industry Almost Entirely Shut Down as Result of Bank Crisis

DETROIT, March 14.

BY Monday night operations in the automobile industry had approached the closest in years to a state of complete paralysis. After running some of its plants on Monday, Chevrolet closed down indefinitely, the date of resumption of manufacture to be governed by the renewal of retail buying, which is expected soon after banks are reopened. All other General Motors divisions likewise are idle. For all practical purposes, Ford's Rouge plant is down, although work on a modest scale is continuing in a few departments. Most of Ford's local suppliers have ceased production temporarily.

Excluding Ford, motor car production in February is estimated at 88,541 units by the National Automobile Chamber of Commerce. In the first two months of the year members of the chamber assembled 202,403 units.

Employees Paid in Currency

Most automobile companies still had enough cash on hand last week to pay employees in currency. General Motors continued its policy of paying its workmen in checks which could be cashed at conveniently located disbursing stations. The main problem troubling automobile executives, however, was not the meeting of payrolls, but that of getting cars to dealers and the temporary halt in retail sales. Dealers, of course, pay cash for cars and likewise bear transportation and other handling charges. They are unable to meet these obligations so long as banks are closed or are restricting their services. Finance companies have been of considerable assistance, but they do not possess unlimited cash resources. The result is that the movement of cars from factories to dealers is virtually paralyzed for the moment.

Steel Orders Are Negligible

The week's developments have been discouraging to the steel trade. The tonnage coming out of the automotive industry just now is negligible in volume. Nevertheless there is a distinctly bright side to the picture. The general feeling among automobile

sales executives is that retail sales will show a brisk upturn as soon as people can get even a portion of their money out of banks. Dealers are reported to be busy making used car appraisals in connection with transactions which will be closed when customers have access to their funds. The number of "clean" deals is surprisingly large in view of conditions. Chevrolet's retail sales in each of the three reporting periods in February in the Flint region, which includes all of Michigan, registered a gain over the immediately preceding period, although the last two periods were concurrent with the State banking holiday.

Chevrolet is being widely applauded, even by competitors, for going ahead with its public showing of its new smaller car last Saturday despite banking difficulties. Chevrolet emphasizes the fact that the "Standard" car is an entirely new car and not a smaller version of the Master car, or a resurrection of an older model. It is being built in three models, the business coupe at \$445, coach at \$455 and coupe with rumble seat at \$475. This represents a reduction of \$40 to \$60 in the base price compared with the Master series. The saving in delivered prices, however, are still larger, because the economies in handling charges will be passed along to the user. The new car is by no means an offering designed for the exigencies of the moment which will be dropped later. W. S. Knudsen, Chevrolet's president, states that its advent marks the commitment of his company permanently to two lines of cars.

Chevrolet's Standard Six, as the car is called, looks like the Master Six except that the V-shaped radiator shell has harmonizing paint instead of chromium plating. It is powered by a 60 hp. engine with a bore of 3 5/16 in., stroke of 3 1/2 in. and displacement of 180.9 cu. in. The three-bearing crankshaft, with four integrally-forged counterweights, weighs 57 lb. Front and rear springs consist of six chrome-vanadium steel leaves 1 1/4 in. wide. Wire wheels have 40 riveted spokes; all hardware is chromium plated. The frame has a drop-chan-

nel section with kick-up front and rear to lower the center of gravity. The coach of the new series weighs about 2700 lb., compared with 3200 lb. for the same model in the Master series. The wheelbase is 107 in.

Chevrolet Increases Lead

In the first two months of the year Chevrolet increased its share of General Motors domestic retail business to 77 per cent, as against 71 per cent in the same period of 1932. Chevrolet's portion of General Motors production in January and February amounted to 77 per cent, compared with only 68 per cent in the same months of last year. Chevrolet's domestic retail sales the past two months totaled 71,974 cars; a year ago they were 67,149. Registrations from 40 states and the District of Columbia for January reveal the following ranking: Chevrolet, 25,826 cars; Ford, 10,803; Plymouth, 10,134; Pontiac, 3987; Buick, 3336; Dodge, 2904. Terraplane dealers sold 1301 cars; Willys, 844, and Continental 6. General Motors cars accounted for 50 per cent of total sales.

Willys-Overland has received court authority to proceed with the manufacture of 4000 trucks for the International Harvester Co. to be delivered in March, April and May.

South Africa Builds Own Steel Plant

South Africa's first government-owned and operated steel plant is expected to reach a production stage by the end of this year, according to a report to the Iron and Steel Division of the Commerce Department from Commercial Attache Samuel H. Day, Johannesburg. The new plant located near Pretoria, in the Union of South Africa, is said to be the most modern in equipment and design of any steel plant in an important agricultural country. The estimated cost of the plant is £5,500,000 and it is said it will be capable of producing 150,000 tons of steel per year. It is believed that the first item produced in the new plant will be railroad rails.

United States Supreme Court Finds for Appalachian Coals

Decision of Far-Reaching Importance Upholds Selling Agency Alleged to Be Violating Anti-Trust Law

WASHINGTON, March 14.—The United States Supreme Court yesterday handed down its long-looked-for decision in the case of Appalachian Coals, Inc., a selling agency composed of 137 coal producers, against which action was brought as a test of the Sherman anti-trust act.

The Supreme Court declared, with only Justice McReynolds dissenting, that the selling plan of Appalachian Coals, Inc., does not violate the Sherman law. This decision is of far-reaching importance and has been awaited with great interest by many industrial organizations.

Chief Justice Hughes, who wrote the decision, held that the selling agency instead of being a combination in restraint of trade, was "merely engaged in a fair and open endeavor to aid the coal industry in a measurable recovery from its plight," as the coal producers had contended. Although the Supreme Court held that the Government had failed to show adequate ground for an injunction, it ordered that Appalachian Coals, Inc., must remain under Government scrutiny and that the court would retain jurisdiction and "might take further proceedings if future developments justify that course in the appropriate enforcement of the anti-trust act."

In part the decision read as follows:

"A cooperative enterprise, otherwise free from objection, which carries with it no monopolistic menace, is not to be condemned as an undue restraint merely because it may effect a change in market conditions, where the change would be in mitigation of recognized evils and would not impair, but rather foster, fair competitive opportunities.

"Voluntary action to rescue and preserve these opportunities, and thus to aid in relieving a depressed industry and in reviving commerce by placing competition upon a sounder basis, may be more efficacious than an attempt to provide remedies through legal processes.

"The fact that the correction of abuses may tend to stabilize a business, or to produce fairer price levels, does not mean that the abuses should go uncorrected or that cooperative endeavor to correct them necessarily constitutes an unreasonable restraint of trade.

"The intelligent conduct of commerce through the acquisition of full information of all relevant facts may properly be sought by the cooperation of those engaged in trade, al-

though stabilization of trade and more reasonable prices may be the result.

"Putting an end to injurious practices and the consequent improvement of the competitive position of a group of producers is not a less worthy aim and may be entirely consonant with the public interest, where the group must still meet effective competition in a fair market and neither seeks nor is able to effect a domination of prices.

"In the instant case there is, as we have seen, no intent or power to fix prices, abundant competitive opportunities will exist in all markets where defendants' coal is sold, and nothing has been shown to warrant the conclusion that defendants' plan will have an injurious effect upon competition in these markets."

To Discuss Welding for Steel Buildings

The practical design of welded steel structures will be the subject of a lecture to be given on the evening of March 23 at the Engineering Societies Building, New York, by H. M. Priest, designing engineer, American Bridge Co. Special invitation is extended to those concerned with design and fabrication of structural steel. The New York Section of the American Welding Society is sponsor of the meeting. F. H. Frankland, director of engineering service, American Institute of Steel Construction, will preside.

Railroads Oppose Appeal For Rate Reduction

WASHINGTON, March 14.—Railroads last Wednesday petitioned the Interstate Commerce Commission to dismiss a joint memorial by coal, lumber and farm interests asking that the commission order the carriers to reduce rates on basic commodities throughout the country. The reduc-

"What the Machine Has Done to Us"

OWING to the time required for the preparation of the numerous charts in Mr. Giele's next installment of his series, its publication has been postponed until next week. This installment will deal with the record of mechanization and investment.

tion was sought with the "greatest expedition" to meet the emergency which it was declared confronts the basic industries of the country.

The railroads' reply, made through the Association of Railway Executives, called attention to the fact that the interstate commerce act requires full hearing before rate reductions can be made. It is pointed out that the critical condition of the carriers is one of the most conspicuous features of the present depression and that means for remedying it have constituted and still constitute "the subject of solicitous preoccupation on the part of the Congress of the United States."

The rate reduction petition, it is stated, simply requests a duplication of what is being done in connection with the rate structure investigation. It is further added that the petition to reduce rates presents no evidence that a reduction would result in an increase in revenue and that in the absence of such showing "the logical and proper inference is the reverse."

The commission will hear oral arguments on March 25, to determine whether or not to conduct an investigation on the shippers' petition.

▲▲ OBITUARY ▲▲

WILLIAM P. F. AYER, formerly vice-president and sales manager of the Walworth Mfg. Co., died at St. Petersburg, Fla., on March 9, aged 61 years. Leaving the hardware business in 1889, he went to work for the Walworth Mfg. Co. and worked his way up to the vice-presidency. He retired six years ago.

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CHARLES M. SAMES, since 1916 associate editor of the American Society of Mechanical Engineers, New York, died suddenly at his home in New York on March 8, aged 67 years.

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NICHOLAS MENSIIH, metallurgist for the Buffalo Electric Furnace Co., died in Buffalo, Feb. 28. He was a graduate of the Mining Institute, Leningrad, Russia. After 17 years' experience in Russia and other countries, including the construction of the first open-hearth furnace and oil crucible furnace for alloy steel in Java, Mr. Mensiih came to the United States, and shortly thereafter became combustion engineer at Canton, Ohio. Previous to joining the Buffalo Electric Furnace Co., he was assistant chief research engineer of Illinois Steel Co., South Works.

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HARRY E. CAMERON, engineer in the general offices of the American Bridge Co., Pittsburgh, died at his home in that city on March 13. He had been identified with the Bridge company since 1905.

PERSONALS

HENRY S. BEAL has severed his connection with the Jones & Lamson Machine Co., Springfield, Vt., of which he was general manager, to become president of the Sullivan Machinery Co., Chicago. He has been identified with the Jones & Lamson Company since 1909, where he started as a machinist, then traveling demonstrator, manager of cost accounting, sales manager and general manager. Because of his withdrawal from the machine tool industry, he has retired as president of the National Machine Tool Builders' Association, Cleveland. ARTHUR E. BLACKWOOD, who has been elected chairman of the board of the Sullivan Machinery Co., has been with that company since 1897. Until 1919 he was manager of the New York sales office. In the latter year he went to Chicago as vice-president in charge of financial matters and was elected president four years ago. Mr. Blackwood is vice-president of the Chicago Metal Trades Association.

C. MARSHALL TAYLOR, for the past six years vice-president and general manager of the Curtin-Howe Corp., has been made manager of the new products division of the G. M. Basford Co., New York. He was formerly identified with Sharples Solvents, the Philadelphia & Reading Railroad and the International Creosoting Construction Co. The new products division was organized to assist companies in adding new articles to their lines, particularly under present economic conditions.

E. A. MULLER, president of the King Machine Tool Co., Cincinnati, and first vice-president of the National Machine Tool Builders' Association, Cleveland, has assumed the duties of the presidency under the provision of the association's constitution, succeeding Henry S. Beal, who has re-

tired because of his withdrawal from the machine tool industry.

THOMAS A. MARSH has become a partner in the Ernest E. Lee Co., Chicago, manufacturers' representative. Mr. Marsh was chief engineer of the Green Construction Co. for 10 years. He also served as Western engineer for the Combustion Engineering Corp. and as president of the Modern Coal Burner Co.

A. D. BACH, president, New England Metallurgical Corp., Worcester, Mass., is to speak on "The Practical Heat Treatment of Steel" at the regular monthly meeting of the Worcester chapter of the American Society for Steel Treating, March 16, at the Aurora Hotel, Worcester.

GEORGE A. RANNEY will resign, effective May 1, as vice-president of the International Harvester Co., to assume the vice-chairmanship of the Peoples Gas Light & Coke Co., Commonwealth Edison Co., and Public Service Co. of Northern Illinois, all with headquarters at Chicago. Prior to Mr. Ranney's association with the Harvester company he spent nine years with the Bank of Montreal's Chicago office. His connection with the Harvester company dates back to 1898, when he joined the McCormick Harvesting Machine Co. In 1916 he received the titles of secretary and treasurer and in 1922 became a vice-president. Five years ago he was elected a director and a year ago was made vice-president of sales. He has been a director of the First National Bank of Chicago and also a director of the Continental-Chicago Corp.

C. C. PINKNEY, formerly with the Bethlehem Steel Co., has become New England sales representative of A. Milne & Co., New York and Boston.

E. G. HILL, industrial fellow of the Mellon Institute of Industrial Research, Pittsburgh, will speak on "The Constituents of Cast Iron" at a meeting of the Pittsburgh Foundrymen's Association, to be held at the Fort Pitt Hotel, Pittsburgh, on March 20, at 6.45 P. M.

EVERETT D. BETTS, head of the Betts & Cole Heater Co., Marshall, Mich., which recently was acquired by the Rudy Furnace Co., Dowagiac, Mich., has joined the Rudy organization.

HAROLD S. STROUSE, treasurer, Harnischfeger Corp., Milwaukee, was elected a member of the board of directors at the annual meeting. His initial connection with the company was in the capacity of advertising manager.

J. F. ALEXANDER, formerly assistant to the vice-president and general manager of sales of the American Steel & Wire Co., has been assigned to the office of CHARLES L. WOOD, vice-president, United States Steel Corp. Mr. Alexander will be engaged in special duties under the direction of Mr. Wood.

DAVIS S. GASTON has been appointed sales manager of tin mill products for the Follansbee Brothers Co., Pittsburgh. J. C. KILROY has been named sales manager in the jobbing department.

Magnetographic and X-Ray Examination of Some Pipe Welds

Since publication of the above mentioned article (THE IRON AGE, Feb. 2, 1933) it has been called to the author's attention that the faulty specimens among those shown were all electric welds, while the sound specimens were gas welds, and that this might possibly indicate an intention on our part to discriminate against electric welding.

In fairness to the proponents of electric welding it should be stated that there was no such intention. The photographs used were selected from a large number and it would have been equally possible to have shown sound electric welds and faulty gas welds. We are assured by the fabricator that this is in line with his experience over a period of years. Our procedure was to have the welder intentionally produce both sound and faulty welds of each type.

Our purpose was not to cite any one method of welding to the disadvantage of another, but rather to record experimental results obtained in non-destructive weld testing by the X-Ray and the newer and lesser known Magnaflex method.—F. B. Doane, formerly of the Pittsburgh Testing Laboratory (now of the A. V. deForest Associates, Pittsburgh, Pa.)



H. S. BEAL



C. M. TAYLOR



E. A. MULLER

Banking Legislation Expected To Stabilize Steel Prices

Washington Opinion Also Is That Plant Operations
Will Expand Substantially in Next Few Months

By L. W. MOFFETT

WASHINGTON, March 14.—Sweeping emergency banking legislation rushed through Congress in seven and one-half hours under the firm direction of President Roosevelt has raised hopes for greater stabilization of prices in the iron and steel industry. It is predicted that this will come about at an early date, and that it will be followed by an expansion of operations.

The opinion has been expressed that within six months, barring unforeseen checks, there will be a substantial increase in steel output, with at least some operations reflecting results in black instead of the monotonous and discouraging red. Obviously, the surmise cannot be based on tangible evidence but it has come from conservative quarters.

The belief is stronger than at any other period since the securities crash in October, 1929, that the end of the deflation has been reached. The Government dictatorship over banking has returned large volumes of hoarded gold and currency to the banks. At the same time the banks have been supplied with a large issue of new Federal Reserve notes. According to Speaker Rainey, the Government is prepared to issue these notes up to \$11,000,000,000, if necessary. However, it is the purpose of the Government to control the currency and permit only moderate inflation.

"This legislation makes possible the opening of banks upon a sound basis, backed by an adequate supply of currency," said Secretary of the Treasury Woodin. "Through this law the banks which will open will be placed in a position to meet all demands. This assurance should restore confidence and create the foundation for a forward movement in business activities."

The mechanics of the legislation have been detailed in the daily press and it is not necessary to repeat them.

Inflation to Be Restrained

Whether we are technically or otherwise off the gold standard, it is the strong determination of the Administration to prevent unrestrained inflation and devaluation of the dollar. "Controlled inflation," however, is planned as a means of increasing prices. The degree of increase apparently will rest with the policy of the

Government and the reaction of the public to the new policy. A problem that lies ahead is management of foreign exchange, according to those who contend that the United States is off gold. The freeing of gold, under a license system, it is argued, for export ought to be possible.

To support the emergency legislation for establishing a sound Government credit structure, President Roosevelt called for a balancing of the budget. He asked for broad powers governing pensions and other veteran benefits by which it is proposed to cut down Government costs by \$500,000,000. Reorganization of the Government departments under an act passed by the lame duck session is immediately planned by which further drastic slashes in expenditures are contemplated in a vigorous effort to make the Government overcome a deficit that otherwise promises to mount up to \$5,000,000,000 by the end of the current fiscal year.

The President is seeking to live up to his campaign pledge to see that the Government put its own house in order and live within its income, and thus firmly fix its credit and restore confidence to the country and business.

Railroad Problem to Come Up Soon

While no official announcement has been made, it is expected that at the next session of Congress, which may convene after a few weeks' recess of the present session, the railroad problem may be taken up. The crisis in the railroad situation is clearly one of several disturbing factors that are pressing for early solution. Widespread reorganization of the capital structure of the railroad system appears to be comparatively near at hand, partially through the recently enacted bankruptcy act. But an even larger prospect is legislation looking to unification of the lines, together with coordination with other forms of transportation.

The condition of the railroads is a check upon improvement that might develop in the steel industry as the result of the new banking legislation. For it is realized that the railroads are not likely to come into the market for large requirements until after they have been placed in a sounder financial situation. It is understood that the Roosevelt Administration is

giving considerable attention to the railroad situation, with a view to asking early legislation in an effort to remedy it.

Plan Removal of International Trade Restrictions

Meanwhile the Administration is actively planning removal of international trade restrictions and reduction of armaments. Secretary of State Hull feels these matters must be straightened out before the world can be started on an upward trend and is planning for adjustment through international agreement of trade and exchange restrictions. Many think these are a long way off. There are those too who are afraid the plan looks to a lowering of the American tariff that would be extremely harmful to industry in this country. There also is a growing feeling that the Administration ought to take action to offset the effect of depreciated currencies of foreign nations which permit imports of low-priced products to the injury of American industry. While the Administration desires to restore the gold standard to these countries, extreme doubt has been expressed that this is likely at an early date, and it is contended that meanwhile the problem of depreciated foreign currencies should be met adequately.

Believes Bank Crisis Will End Commodity Deflation

Benjamin Schwartz, director general, Institute of Scrap Iron and Steel, has issued the following statement regarding conditions which the scrap industry is facing today:

"The national banking holiday, as shocking as it has been to our economic system, is bound to bring with it benefits that could not have been obtained except through the lightning stroke of a crisis. It will mean the end of the continuous deflation of commodities, including our own, to levels where all reasonable values seem to have been destroyed. It will certainly mean the reorganization of an antiquated banking system, which has failed either to supply expected leadership in the past or to conform to the responsibilities of a complex economic life. We believe that the last piece of bad news is out and that the holiday will be the beginning of the upturn.

"The collapse was due to the lack of cooperation. Congress would not cooperate with the President; bankers and business leaders would not cooperate with each other; parties, groups and even nations which could have avoided the crisis by cooperation, refused to work together for a common solution. The crisis had to come, and the results therefrom should be highly beneficial, in view of the fact that for the first time in the history of the depression all groups are now cooperating and pledging allegiance to constructive leadership in Washington."

EDITORIAL COMMENT

Has the Cat Come Back?

THE resumption of trading in foreign exchange, subject to restrictions intended to eliminate speculation, was followed by a rise in the dollar to levels above those prevailing before the banking holiday. The pound sterling fell to \$3.39½, or 6½c. below the closing quotation on March 3, and there were declines in the French franc, the Dutch guilder, the Swiss franc and the Belgian belga. If this initial test indicates that there will be no depreciation of the dollar in international marts as a result of recent events, American industry will again face the deflationary pressure of world prices. And if the American manufacturer must still meet the competition of imports from depreciated currency countries, he is just where he was before the gold embargo was declared. He wonders, and not without grave apprehensions, whether the cat has come back.

1932's Steel Losses

EARLY returns of the financial havoc of 1932 in steel indicate losses averaging fully \$13 a ton. Of five companies which together accounted for 65 per cent of last year's output, four made drafts on surpluses to the amount of \$101,632,000; the fifth, the National Steel Corp., made a profit of \$1,662,900. The combined production of the five was 7,220,000 net tons. But to ascertain the unit loss, allowance had to be made for activities apart from those of the making or selling of steel. The revised calculation gave the \$13 quotient mentioned; and this seemed likely to be changed but little for the 35 per cent of the industry for which financial statements were not yet available.

With losses of such magnitude, one can understand the vehement rejoinders which have met demands for reduced prices. Especially was this the case early last year when self-appointed experts harangued for a price slashing in the interest of wholesale deflation. Now we have a rough approximation of the year's average cost. As a measure of unit income, we may take THE IRON AGE composite price for finished steel; it averaged 1.957 cents a pound last year, or \$39.14 a net ton. A \$13 loss per ton on top of this would point to an average ton cost in excess of \$50. Yet a year ago grave doubts were cast on statements in these columns respecting costs of comparable amounts for the scale of activity then current. With a rapid rise in costs to be expected with a reduction in the rates of operation, which of course took place, it is not surprising that costs outran all relation to prices.

The year's performance stands in marked contrast with 1900, a year of the same tonnage output as 1932 but one of a high engagement of capacity. According to Burton J. Hendrick, in his recent "Life of Andrew Carnegie," the Carnegie Steel Co. in that year made 4,000,000 tons of steel and \$40,000,000 of profit—\$10 a ton. THE IRON AGE steel composite price for that year shows an average of \$45.80 a ton, but this was undoubtedly more than the Carnegie Company received, in view of its preponderance of heavy tonnage business and so by inference

cost was under \$35. The comparison of 1932 with 1900 illustrates particularly the overwhelming load which overhead imposes as the volume of manufacture rapidly dwindles. Surely what the industry needs is not a 10 per cent increase in volume, as some apparently would achieve by the occasional shaving of price, but a 100 per cent or a 200 per cent volume increase, when price would be likely to obtain a speaking acquaintance with cost.

Fits Sales Talk To Customer's Environment

WITH many companies possessing tens of thousands of dollars worth of idle equipment, one of the difficult tasks confronting the machine tool seller is to convince the prospective buyer that he should purchase a new tool to do a certain job rather than use an old machine.

One machine tool company catering to the automobile industry is solving this problem in an interesting way. It is pointing out to the prospective customer that the problem facing him is similar to that facing a motorist who has the choice of three roads to take him where he wants to go. The first is a winding gravel road with many ruts which is hard on tires and ideal for developing body squeaks and rattles. The second is an unattractive route leading many miles out of his way and requiring an excessive amount of gasoline and oil, as well as wear and tear. The third road is a wide, smooth, paved highway going to the objective almost as the crow flies. By taking it he will reach his goal with less effort, in less time, at less cost than by any other route.

Would any motorist hesitate in making a choice, when his chief purpose is to get to his destination as quickly, easily and economically as possible? Should any machine tool user hesitate in making a choice of suitable equipment under similar conditions?

One Way to Reduce Taxes

ON a recent visit to a manufacturing company in central New York State we found several large factory buildings in process of demolition. "No, we are not going out of business," we were assured. "To reduce our expenses we are cutting our plant capacity in half. We believe that even that is much more than we shall need for a long time."

Meanwhile, this company is cutting its local and county taxes close to 50 per cent, not to mention the saving in maintenance expense and fire insurance premiums.

The cost of carrying plants swollen to boom-time proportions is threatening the existence of many companies whose prospects of surviving the depression would be materially enhanced by courageously slashing that all too commonly oversized "Real Estate, Plant and Equipment" item on the balance sheet.

... LETTERS TO THE EDITOR ...

Editor, *The Iron Age*:

YOUR recent editorial defining the price cutter as public enemy Number 1 states in a very forceful way just what the price cutter does and the frightful consequences that follow in his path. Nearly every business man who reads the article will recognize in it a perfect picture of his most disliked competitor. It is characteristic of competitors that they are price cutters, but the business man himself is never one. I have spent a lot of time hunting price cutters and find that instead of being "unscrupulous and dishonest" they are among our best people, sturdily deny any taint of price cutting, while at the same time they are actually cutting prices or forcing others to do so, without having the mildest suspicion that they are in any way guilty.

The man who goes out and deliberately cuts prices is so rare that any effect from his activities may be forgotten. A minimum of business experience shows any man that his competitors will not let him cut a price. They will promptly meet any price that he sets, and reestablishing a parity of price at a lower level. Generally all competitors must quote the same price for the same goods under like conditions. The exceptions to this rule are important but need not be noted here. The influences today that are doing the damage are price cuts that are so indirect and subtle that they are not recognized by their instigators. The first is the ignorant price cut of the firm who thinks he is "protecting his customer" or "meeting a situation."

Somehow or other a buyer or a salesman has given him the idea that dirty work is afoot and that he must meet competition or lose a customer. The ordinary manufacturer has not much protection from this kind of misrepresentation though he could get such protection if he went about it. Price cutting of this sort is due to misrepresentation of the facts. No one manufacturer is in position to get an accurate knowledge of these facts, but all the men in the group can get them readily enough and guard themselves against the results of misrepresentation.

Every man in business has a natural ambition for his business to grow. When the total demand is increasing he can get his increase and is happy. When the total demand is decreasing he can get his increase only at the expense of his competitors. His weapons may be better goods, better service, more sales ability, more merchandising ability or lower prices—it makes very little difference which. When his competitors in turn find their trade decreasing through the loss of customers, they must in-

crease their sales efforts, with the usual result of cutting prices on a purely defensive basis. These men are not villains, they are simply ignorant of the natural limits of their ambitions, and the proportion of sales effort to attainable result. No one man is responsible; as a group they are all responsible because the facts they require to defend themselves from this type of price cutting are readily available. The cure is a knowledge of the facts about volume, and the natural participation of competitors in that volume.

Another common case is that of the firm which actually forces price cuts by others. Manufacturers grade rich and poor, wise and foolish, intelligent and stupid. If the rich, wise and intelligent by aggression crowd the poor or foolish or stupid by taking away the customers who represent their livelihood, they force them to retaliation which usually means a price cut. If the smart and alert manufacturer out-advertises, out-sells and out-merchandises his competitor, he paves the way to a defensive price cut. It makes very little difference whether the price is 10 per cent lower or whether the goods or service is 10 per cent better, one is as much of a price cut as the other. There is inequality between competitors in most fields and this inequality breeds price cutting. Cooperative action by manufacturers to regulate competition is the only defense against this inequality. This result is the consequence of ignorance of the laws of competition and economics, and surely does not proceed from dishonesty, but from an ignorance of the necessary reactions from the forces he sets in motion.

Beyond the direct price cut of the man who thinks his competitors will allow him to annex their customers by a reduction below current prices there are at least three types of price cuts outlined above. The first is due to misrepresentation, the second due to the pursuit of unattainable ambitions, the third is due to lack of knowledge of the laws that govern business. All three are due to ignorance either of fact or economic law. The only cure for ignorance is information, and the source of information is not far to seek.

If these conclusions are correct, the horns and tail have been removed from the price cutter and he stands among us as one of ourselves. He is not unscrupulous or dishonest, but just a man who makes mistakes because he has not the equipment to prevent mistakes. Once he recognizes his mistakes, he will be the first to take steps to correct them. A man cannot run a business correctly without knowledge of all the facts, and an industry is no easier to run than a business.

Armed with the facts, with a knowledge of the laws that govern competition, and with the knowledge that his competitors are proceeding with the same facts and laws, and a man may compete with a better chance to gain his objective of profit, without wasting his energy and property in a blind fight in the dark.

Samuel T. Hobbs,
16 Norwich St.,
Worcester, Mass.

Industrial Finance

Westinghouse Electric & Mfg. Co., East Pittsburgh, in the year ended Dec. 31, 1932, received orders valued at \$69,082,468 compared with \$128,014,820 in the previous year, and with \$240,220,555 in 1929. Unfilled orders as of Jan. 1, 1933, amounted to \$26,836,494. Operations in 1932 resulted in a net loss of \$8,903,540, compared with a loss of \$3,655,659 in the preceding year, and with a net income of \$11,881,705 in 1930. Current assets as of Dec. 31, 1932, amounted to \$78,816,115, and current liabilities to \$4,333,692, a ratio of 18.2 to 1. One year ago the ratio was 13.6 to 1.

Wheeling Steel Corp., Wheeling, W. Va., had net loss in 1932 of \$3,274,832, compared with \$3,339,139 in 1931. Value of sales in the past year amounted to \$31,022,311, compared with \$45,360,919 in the preceding year. Steel ingot production last year dropped from 691,851 gross tons in 1931 to 511,190. Inventories at the close of the year amounted to \$16,027,984, compared with \$19,608,376 at the end of 1931.

National Steel Corp.'s balance sheet as of Dec. 31, last, shows funded debt was reduced \$1,233,333 during the year, according to the annual report made public Monday. Depreciation of \$3,089,912 was approximately equal to that of \$3,117,402 charged off in the previous year and reserves of \$1,467,526 for furnace relining and rebuilding showed an increase over those of \$1,343,942 at the end of 1931. "During the entire year business generally was on a very unsatisfactory basis, and the volume of tonnage and the prices secured for our products were considerably below the average for the preceding year," Ernest T. Weir, chairman, stated in his remarks to stockholders. "The fact that the company was able to continue to earn a profit for each month of the year, I think, will indicate to the stockholders our strictly competitive position in the trade, the strength of our organization, and the value of our properties."

The Ludlum Steel Co. reports a total net loss for 1932 of \$474,310, of which \$165,860 was the loss directly chargeable to operations. Net sales of the company last year were about 36 per cent below those of 1931.

SUMMARY OF THE WEEK'S BUSINESS

Steel Industry Expects Gain in Volume as Confidence Returns

Steel Scrap and Non-Ferrous Metals Higher in Price—Some Speculative Inquiry for Pig Iron for the Last Half

THE aftermath of the banking holiday and reorganization of the banking system as affecting the iron and steel and allied industries is a widespread expectation of a rising volume of business and a higher price level, which has already been reflected in an advance of 25c. a ton in heavy steel scrap at Pittsburgh, sharp price increases on non-ferrous metals, and a general decision among producers of pig iron and finished steel not to sell for delivery beyond the second quarter, notwithstanding the desire of some consumers to cover for longer periods, particularly for pig iron.

Although steel ingot production for the country at large has slid off to a shade under 15 per cent, with the possibility of a further decline before the turn arrives, the steel industry is confident that the resumption of banking activity throughout the country this week will bring a measurable improvement before the end of the month. Much of the further falling off in steel business is directly traceable to the shutting down of several automobile plants.

Current ingot output is possibly a little more than is required by this week's finishing mill schedules, but some steel companies are not averse to putting raw steel in stock to prepare for a possible quick resumption of steel buying.

The outstanding activity of the week was in inquiries rather than orders. Consumers of steel and pig iron are showing considerable interest in the second quarter, and there have been some tentative inquiries for pig iron for the entire last half. Producers will sell either steel or pig iron for the coming quarter at present quotations, but have generally declined to consider sales for delivery beyond that period. Makers of strip, both hot-rolled and cold-rolled, have reaffirmed present prices for the next quarter, and it is expected that the current quotations on bars, shapes and plates will also be extended into the next contract period.

PRODUCTION of steel has been most sharply affected in districts largely dependent upon the automobile industry, notably Youngstown and Cleveland. Mills in the latter city, which recently attained a maximum average rate of 44 per cent, are down to 17 per cent, while the Youngstown district has declined to 15 per cent from a recent peak of about 20 per cent. In other districts the rate of operation has not materially changed. In eastern Pennsylvania a slight rise has occurred.

The automobile industry has come closer to a state of complete paralysis than at any time in years. Most of the larger plants are virtually idle for an indefinite period, the time of resumption to depend upon the

revival of retail sales, which have been markedly affected by bank closings. Despite its present stagnation, the automobile industry is confident that a brisk upturn in sales will develop soon after the banking situation has been ironed out.

Structural steel lettings for building construction, at 6600 tons, are light, but an early award of 125,000 tons of shapes and 20,000 tons of cable for the San Francisco-Oakland bridge, on which bids have been taken, is expected. Railroad inquiries are negligible, but the decision of the Interstate Commerce Commission permitting the continuance of freight rate surcharges until Sept. 30 has removed at least one obstacle to a resumption of railroad buying. However, it is generally believed that the carriers will await Congressional action on their major problems before undertaking anything but the most necessary purchases.

The expected legalization of beer this week will release considerable steel tonnage for tanks and other equipment that has been pending for some time. A Milwaukee brewery has ordered 200 tons of plates and will buy 300 tons more. Use of stainless steel for beer barrels is a possible development.

SUCH activity as has developed during the week was mainly of a speculative character, but may indicate a trend. The belief in many quarters that currency inflation may bring higher prices has brought out much larger inquiry for pig iron, particularly at Chicago, Cleveland and Philadelphia. Some Eastern consumers, who have been depending largely upon cheap foreign pig iron, are presumably of the opinion that foreign exchange developments may work against further low-priced imports, and they are "feeling out" the domestic market. On the other hand, our export trade has shown a slight pick-up, which is much more marked in nickel and tungsten than in steel.

A purchase of a fair-sized tonnage of heavy melting steel scrap by a Pittsburgh district consumer at \$8.75 a ton, an advance of 25c. a ton, is evidently a forerunner of even higher prices should any further buying develop, as the dealers who sold this tonnage have had difficulty in filling the order without a loss owing to the reluctance of owners of scrap to part with their accumulations at present low prices.

The advance in prices of non-ferrous metals has been accompanied by brisk buying, with limits being placed by some producers as to the amounts they will sell at current levels. Lead and zinc are \$7 a ton above their prices of a week ago, copper is \$15 a ton higher, while tin has also strengthened, with future developments awaiting a clarification of the foreign exchange situation.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:

	Mar. 14, 1933	Mar. 7, 1933	Feb. 14, 1933	Mar. 15, 1932
No. 2 fdy., Philadelphia.....	\$13.34	\$13.34	\$13.34	\$15.64
No. 2, Valley furnace.....	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'ti.....	13.82	13.82	13.82	13.82
No. 2, Birmingham.....	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago*.....	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa.....	13.50	13.50	13.50	16.00
Basic, Valley furnace.....	13.50	13.50	13.50	14.50
Valley Bessemer, del'd P'gh..	16.89	16.89	16.89	17.39
Malleable, Chicago*.....	15.50	15.50	15.50	16.50
Malleable, Valley.....	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago.....	23.17	23.17	23.17	23.17
Ferromanganese, sea'd car-				
lots	†68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Contract price; spot quotation \$61.

Rails, Billets, etc.

Per Gross Ton:

	Mar. 14, 1933	Mar. 7, 1933	Feb. 14, 1933	Mar. 15, 1932
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill.....	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.60	1.60	1.60	1.50

Finished Steel

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.50
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.65
Bars, New York.....	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.50
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.648	1.648	1.698	1.798
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.50
Structural shapes, Chicago..	1.70	1.70	1.70	1.70
Structural shapes, New York.	1.86775	1.86775	1.86775	1.76775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh.	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh.	1.80	1.80	1.80	2.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel

Per Lb. to Large Buyers:

	Mar. 14, 1933	Mar. 7, 1933	Feb. 14, 1933	Mar. 15, 1932
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.00	2.00	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.10	2.10	2.00	2.30
Sheets, galv., No. 24, P'gh..	2.60	2.60	2.50	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.70	2.70	2.60	2.95
Hot-rolled sheets, No. 10, P'gh.	1.40	1.40	1.45	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill.....	1.50	1.50	1.55	1.65
Wire nails, Pittsburgh.....	1.85	1.85	1.80	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.85	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., Pittsburgh	2.35	2.35	2.30	2.60
Barbed wire, galv., Chicago dist. mill.....	2.40	2.40	2.35	2.65
Tin plate, 100 lb. box, P'gh..	\$4.25	\$4.25	\$4.25	\$4.75

Old Material

Per Gross Ton:

	Mar. 14, 1933	Mar. 7, 1933	Feb. 14, 1933	Mar. 15, 1932
Heavy melting steel, P'gh...	\$8.75	\$8.50	\$8.50	\$10.25
Heavy melting steel, Phila...	6.75	6.75	6.75	7.37½
Heavy melting steel, Ch'go...	5.25	5.25	5.25	7.12½
Carwheels, Chicago.....	8.00	8.00	8.00	7.00
Carwheels, Philadelphia.....	8.00	8.00	8.00	9.50
No. 1 cast, Pittsburgh.....	9.00	9.00	9.00	9.50
No. 1 cast, Philadelphia.....	8.00	8.00	8.00	10.00
No. 1 cast, Ch'go (net ton)...	6.25	6.25	6.25	7.00
No. 1 RR. wrot., Phila.....	7.50	7.50	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	5.50

Coke, Connellsville

Per Net Ton at Oven:

	Mar. 14, 1933	Mar. 7, 1933	Feb. 14, 1933	Mar. 15, 1932
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.25
Foundry coke, prompt.....	2.50	2.50	2.50	3.50

Metals

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	5.50	4.75	4.75	5.75
Lake copper, New York.....	5.75	5.00	5.00	6.12½
Tin (Straits), New York....	24.12½	...	23.60	21.65
Zinc, East St. Louis.....	3.20	...	2.65	2.80
Zinc, New York.....	3.57	...	3.02	3.17
Lead, St. Louis.....	3.22½	2.87½	2.87½	3.00
Lead, New York.....	3.35	3.00	3.00	3.15
Antimony (Asiatic), N. Y...	6.25	5.62½	5.75	6.20

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

March 14, 1933
One week ago
One month ago
One year ago

1.923c. a Lb.
1.923c.
1.923c.
1.933c.

Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.

	HIGH	LOW
1932	1.977c., Oct. 4;	1.926c., Feb. 2
1931	2.037c., Jan. 13;	1.945c., Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29
1928	2.286c., Dec. 11;	2.217c., July 17
1927	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$13.56 a Gross Ton
13.56
13.56
14.47

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
\$14.81, Jan. 5;	\$13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

Steel Scrap

\$6.92 a Gross Ton
6.83
6.83
8.25

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
\$8.50, Jan. 12;	\$6.42, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

Pittsburgh Steel Output Holds At a 14 Per Cent Rate

New Orders for Steel Are Curtailed, But Contract Specifications Are Well Maintained—Steel Scrap Higher

PITTSBURGH, March 14.—Despite further curtailment in new orders for finished steel products in this district, releases against contract business have held up fairly well, and there has been no further decline in steel ingot production at Pittsburgh. Finishing mill schedules have been adversely affected in many instances, but producers seem more willing to stock a small amount of raw steel than to suspend open-hearth operations.

Last week production did not fall under 14 per cent, even though a lower rate seemed in prospect. No change is expected this week, and it is now believed that most of the recent decline will have been made up by the end of the month. In the Valleys and nearby northern Ohio plants, steel output has declined to about 15 per cent, while no change is recorded in the Wheeling territory. Sheet mill schedules are lower, but tin mills are holding at the same rate as last week.

Resumption of banking activity this week is expected to release considerable business, particularly of the small miscellaneous type, which had been most affected by the banking holiday. The major consuming industries are expected to regain their lost ground more slowly, this being particularly true of the automotive industry, which has been severely affected in the last week.

Structural steel awards are lighter, but the expected placing of 125,000 tons of shapes and 20,500 tons of cable for the San Francisco-Oakland bridge has maintained interest in the market. A Steel Corp'n. subsidiary was low on this business. Demand for tubular products from the oil industry has held up better than had been expected, but movement of pipe to other sources is sharply curtailed.

The prospect of the issuance of new currency has given prices a stronger tone throughout the industry. The tendency is most marked in the case of raw materials, and an actual advance has been recorded in scrap. On finished steel products a stronger undertone has been the only noticeable effect, not much test of prices having been offered in the last week.

Pig Iron

Sales continue at a minimum, and shipments last week were much lower than they have been. No merchant furnaces are active in the district. Prices are unchanged in the absence of an adequate test.

Semi-Finished Steel

No inquiry for second quarter has appeared, but sellers have opened their books on billets, slabs and sheet bars at \$26, Pittsburgh or Youngstown. Forging billets command the usual \$5 premium. Wire rods are quiet and the price seems to be holding at \$35, Pittsburgh or Cleveland.

Rails and Track Accessories

The Boston & Albany has ordered 625 tons of tie plates from the Jones & Laughlin Steel Corp'n. The Pennsylvania has recently placed several small miscellaneous orders for spikes. No other new business has come out in the last week, and releases are generally withheld.

Bars, Plates and Shapes

Bidding on the San Francisco-Oakland bridge was the center of interest in the heavy hot-rolled market last week and, with the Columbia Steel Co., a subsidiary of the United States Steel Corp'n., as low bidder, it is indicated that much of the structural steel required may be rolled in the Pittsburgh district. About 125,000 tons of structural shapes is called for by the various contracts. A Pittsburgh firm will also participate in the foundation work, for which a substantial tonnage of sheet steel piling and reinforcing bars will be needed. Otherwise, the heavy hot-rolled market has been unusually quiet, with demand most sharply curtailed by small miscellaneous consumers. A floating dry dock for the United States Navy, requiring 2000 tons of plates, has been taken by a local builder. No substantial river craft tonnage has come out, but a number of inquiries are still before the trade. Demand for bars from the automotive industry has fallen off sharply, and there is a lighter movement to other manufacturing consumers.

While producers have not officially opened their books for second quarter, the current price of 1.60c., Pittsburgh, on bars, plates and shapes is almost certain to apply, and makers have indicated their willingness to extend old contracts.

Cold-Finished Steel Bars

The 1.70c., Pittsburgh, price on cold-finished steel bars has been reaffirmed for second quarter. Scarcely any inquiry has appeared, and releases are sharply curtailed.

Tubular Goods

This market is very quiet, in line with other finished steel products, al-

though producers of oil country goods do not seem to have been affected as much by the banking moratorium as had been expected. Standard pipe is extremely dull, and mechanical tubing has been affected by reduced automotive requirements. Makers of seamless mechanical tubing have announced revisions in quantity discounts, representing reductions on large lots and increases on small tonnages.

Wire Products

Business is very dull, with both new orders and shipments considerably curtailed. Jobbers have hesitated to make further commitments, and shipments to manufacturing consumers are being held up in many instances. About 20,000 tons of steel cable will be required for the San Francisco-Oakland bridge, on which a Steel Corporation subsidiary was low bidder. No deviations from current quotations on wire and nails are reported.

Sheets

While lack of new business has prevented an adequate test of recently named minimum prices on sheets, the move seems to have been favorably received by the trade, and some consumers have indicated their willingness to take contracts at the new levels as soon as the banking situation is stabilized. Releases against old contracts have dropped off appreciably, but operating schedules last week held up better than had been expected, averaging only slightly under 20 per cent of capacity. The current week will bring further curtailment.

Tin Plate

Specifications are holding up fairly well, and operations this week will not fall under the 35 per cent rate, to which schedule dropped last week.

Strip Steel

Further curtailment by the automotive industry has reduced incoming strip tonnage, and production has dropped further in the last few days. Scarcely any tonnage is coming out of Detroit, and small miscellaneous consumers have sustained production in many instances. The 1.45c., Pittsburgh, price on hot-rolled strip is well maintained, and on cold-rolled makers are apparently willing to renew contracts at the prices which have prevailed in the first quarter. This leaves the market quotable at a wide range.

Scrap

Purchase of several thousand tons of No. 1 heavy melting steel by a large consumer at \$8.75 has advanced this grade 25c. a ton. Dealers are already having difficulty covering this order as small collectors and suppliers of scrap are unwilling to sell at this time. Consumers generally show no disposition to buy against an advance in prices, and dealers would sell only

small quantities. The tendency of the market seems to be definitely upward, but an improvement in open-hearth operations in this and nearby districts will be necessary to bring about any substantial increase in prices. No. 2 steel was recently sold into consumption at \$7.75, and dealers have paid as high as \$7.50 to cover. A recent order at \$7.15, involving a small tonnage, seems to be definitely bad from the viewpoint of the sellers.

Coke and Coal

Demand for heating coke improved last week, but shipments of the foundry grade eased off. With no merchant furnaces active in this district, the only large outlet for furnace coke is an eastern Pennsylvania stack. Prices on both coal and coke continue weak.

Buffalo Inquiries For Pig Iron Larger

BUFFALO, March 14.—Several carloads of iron were sold by Buffalo producers last week, and the general banking situation was productive of some interest on the part of melters who are anxiously watching the effect of the Government's new fiscal policy on commodity prices. This has resulted in some tentative inquiries for quotations on sizable tonnages.

Steel

The banking situation has temporarily halted what looked like a definite improvement in the mill operations of this district. Bethlehem Steel Corp., which had been operating four furnaces, and part of the time five furnaces, was down to three last week and expected to continue this operation throughout the current week. Republic Steel had been operating two furnaces since Feb. 12. This plant is now operating one. Wickwire Spencer is operating one furnace.

Scrap

No transactions were reported throughout last week, but the increase in the prices of non-ferrous metals was being closely watched. All material is being firmly held, and apparently scrap prices are stronger. The exportation of large quantities of scrap to foreign countries was undoubtedly accountable for part of this development.

Detroit Scrap Market Virtually Halted

DETROIT, March 14.—The few transactions in the local scrap market the past week failed to reveal any apprehension on the part of consumers that prices may rise as a result of currency inflation. Little material is coming out and dealers report their activities virtually halted until banking operations get under way again.

British Pig Iron Market Gaining; Continental Steel Trade Upset

LONDON, ENGLAND, March 13 (By Cable)—Domestic pig iron demand is improving and output is increasing. Overseas demand for steel is broadening. Further rail orders have been placed by South Africa and China. Domestic steel demand is restricted, with shipbuilders expected to release specifications shortly. The tin plate market is quiet, but output is being maintained at about 65 to 70 per cent of capacity.

Welsh tin plate makers are disturbed by the proposal of the Broken Hill Proprietary Co. to manufacture tin plate in Australia. Sir W. J. Firth of the South Wales Tin Plate Corp. is now on his way to Australia to investigate.

The Continental steel market is influenced by the financial situation in the United States; also by uncertainty as to the ultimate outcome of the sales syndicates to operate under the Cartel. The German political situation is also very disturbing to Continental markets.

It was reported that Belgian steel bar makers had agreed not to quote below £2 7s. 6d., gold basis, but they are now soliciting business at as low as £2 6s.

February exports of pig iron from the United Kingdom were 5600 tons, of which 100 tons were shipped to the

United States. Exports of all kinds of iron and steel totaled 136,000 tons last month.

Machine Tool Orders in February at New Low

Machine tool orders in February reached the lowest point in the history of the National Machine Tool Builders' Association, the sharp decline in business being attributed to the banking crisis.

The index figure of sales for last month was 15.2 against 31.6 for January. The three-months' average was 27.5 against 33.1 for January. Unfilled orders were 35.3, compared with 48.6 in January. Shipments were at about the same level as in January, or an index of 26.7, compared with 26 the previous month. Shipments were almost double the volume of orders.

Dravo Contracting Co. Low on Navy Dry Dock

WASHINGTON, March 14.—Submitting a figure of \$278,200, Philadelphia delivery, the Dravo Contracting Co., Pittsburgh, was the lowest bidder for construction of a steel floating dry dock for the Navy. It will require about 2000 tons of steel, including plates, shapes and bars. The next lowest bid submitted was that of the Pusey & Jones Corp., Wilmington, whose figure was \$359,860. The bids were opened on Wednesday of last week by the Bureau of Yards and Docks, Navy Department.

U. S. Automobile Output 130,114 Units in January

WASHINGTON, March 14.—The output of motor vehicles in the United States in January rose to 130,114 units from 107,353 units in December, according to returns made to the Bureau of the Census by manufacturers. The January production consisted of 108,393 passenger cars, 21,717 trucks and five taxicabs. The Canadian production in January totaled 3358 motor vehicles compared with 2139 in December, and consisted of 2921 passenger cars and 437 trucks.

With a figure of \$262,253, the Bethlehem Shipbuilding Corp. was the lowest bidder on steam and superheater water forged steel drum boilers for six naval destroyers, now being constructed in navy yards. The next to lowest bidder on forged steel drums was the Babcock & Wilcox Co., at \$296,718.70.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export	£9		
Billets, open-hearth	£5	to	£5 7s. 6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	15s.	9d. to	16s.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hearth	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£8 10s.		
Galvanized sheets, No. 24 gage	£10 10s.	to	£10 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86	
Billets, Thomas	£2 3s.
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 7s. 6d.
Beams, Thomas	£2 4s. 6d.
Angles, Thomas, 4-in. and larger	£2 6s.
Angles, small	£2 8s.
Hoops and strip steel over 6-in. base	£3 12s. 6d.
Wire plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Chicago Iron and Steel Market Featured by Many Inquiries

Speculative Tendencies Indicated in Some Requests For Forward Coverage—Actual Business Not Yet Improved

CHICAGO, March 14.—The iron and steel market is featured by numerous inquiries that in many instances have all the earmarks of speculation. Shipments of pig iron are below the February average, and releases on Monday and Tuesday showed no change from recent levels. Ingot output in this district remains at 13 per cent of capacity.

Sellers all along the line are giving close attention to the character of each inquiry. In general, the desire seems to be to meet all demands for iron and steel for immediate shipment and to place orders on books for the second quarter. However, most producers are unwilling to take commitments for more than the next three and one-half months. They reason that if commodity prices are to advance they do not want heavy bookings and thereby be cut away from benefiting from the higher quotations. This attitude places some restraint on sellers who would normally rush out to meet the business that is potentially overhanging the market.

The plate market is more active and some brewery business has been placed at Milwaukee. The scrap market is more sensitive to news within its circle, though transactions are few and small.

Pig Iron

Inquiries for Northern foundry iron are brisk, but sellers are taking time to study the price structure and are hesitant to make commitments beyond the second quarter. Releases for immediate use are not impressive and shipments are slightly below the February rate. Opening of the Illinois waterway arouses discussion as to the feasibility of barge shipments from the Birmingham district. Official rates have not been established, but there is talk of a \$4 rate for the 1800-mile trip. Conversion of old river gunboats into pig iron barges is being considered.

Bolts, Nuts and Rivets

This market remains steady. Contracts are being offered for second quarter. An implement manufacturer has placed a sizable order. Shipments are slightly below the February average.

Reinforcing Bars

New prices being adopted by dealers are serving to drive in a few small jobs. Tests of these prices are not to be had except on extremely small tonnages. Illinois has awarded some pav-

ing tonnage, but Indiana has withdrawn inquiries for 600 tons of bars which were to have been used for road work. Very little road work is now pending in the Central West. Bars for the United States narcotic farm in Kentucky have been awarded to the Knoxville Iron Co.

Cast Iron Pipe

Although work is progressing on the Wilmette, Ill., water plant, orders for the necessary cast iron pipe are still missing. The death of Mayor Cermak of Chicago, it is expected, will retard progress on the preparation of plans for the Chicago pumping station. At Cincinnati the United States Pipe & Foundry Co. is low on 2000 tons of pipe. Transactions in the immediate vicinity of Chicago are limited to a very few less-than-carload lots.

Rails and Track Supplies

Track accessory orders are moderately heavier. This situation, together with more active inquiry, points to broadening of track maintenance programs. This market is without rail business of any kind and sellers have now come to the conclusion that there will be no concerted buying movement, but that railroads will take their requirements as needed throughout the spring and summer.

Wire Products

Wire salesmen are being instructed to offer every assistance to users who wish to cover needs through the second quarter. Inquiries that smack of the speculative spirit and cover tonnages for the remainder of the year are being frowned upon. Producers look upon present prices as being very low and they want to hold the size of order books in check so that should an opportunity present itself to advance prices in the third quarter they will be in a position to benefit by the new quotations. The past week has been very poor. By Monday, however, some releases began to reach mills. Reports from outlying districts point to a gain in confidence that business will improve as spring advances.

Plates

About 3500 tons of plates have been ordered for the repair of oil tanks that are being moved from one location to another in the Southwest. A brewery at Milwaukee has ordered 200 tons and will place an additional 300 tons. Denver, Colo., will open bids March 15 on 2000 tons of plates for a temporary water line. In the railroad field

is an order for four lounge cars placed by the Missouri-Kansas-Texas. The Milwaukee Road has recalled 800 men to its shops. In general, car and locomotive work is irregular, and only small and mixed lots of steel are needed to carry out these light programs.

Structural Material

This market continues to drag, and inquiries are still so few that they do not point to better business. Only one job of size, a hospital at Duluth, Minn., has been held back by the bank moratorium. Bids will be taken March 21. The Rock Island Railroad will soon take figures on altering a bridge which spans the Illinois waterway.

Sheets

All sheet producers in this district have advanced prices to the new level, but some of them are stressing the point that prices are subject to withdrawal on notice, the idea being that if an advance is to be had they want to take immediate advantage of it. Sellers are shying at long commitments and the acceptance of speculative tonnages. The roofing trade is still slow, with little prospect of marked improvement in the early spring weeks.

Bars

This commodity has suffered rather severely because of the check on business imposed by the bank moratorium. The principal drop was in the use by automobile builders. Tractor plants have also slowed down, as have automobile parts makers.

Scrap

The leading producer has purchased a small lot of distress heavy melting steel at \$5 a ton. In general, dealers are not sellers at this time. They are of the opinion that higher prices are in sight. They are willing to buy only when bargains are offered. About 3500 tons of borings are gathered on local docks, and dock piles of heavy melting steel are being added to almost daily.

Unfilled Orders Drop 44,444 Tons

Unfilled orders of the United States Steel Corp. as of Feb. 28 declined 44,444 tons, or from 1,898,644 tons at the end of January to 1,854,200 tons at the end of February.

Unfilled orders at the end of each month since 1930 follow:

	1933 Tons	1932 Tons	1931 Tons
January	1,898,644	2,648,150	4,132,351
February	1,854,200	2,545,629	3,965,194
March	2,472,413	3,995,330
April	2,326,926	3,897,729
May	2,177,162	3,620,452
June	2,034,768	3,479,323
July	1,966,302	3,407,816
August	1,969,595	3,169,457
September	1,985,090	3,144,833
October	1,997,040	3,119,432
November	1,968,301	2,933,891
December	1,968,140	2,735,353

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Eastern Pennsylvania Market Takes on a Stronger Tone

Distinctly Better Feeling Exists—Pig Iron Consumers, Anticipating Import Restrictions, Inquiring—Steel Output Gains

PHILADELPHIA, March 14.—A distinctly better feeling exists in the iron and steel trade in this district. Buoyed up by the swift and constructive action of President Roosevelt, the market has taken on a stronger tone. While prices have not advanced, consumers are showing greater interest in anticipation of a general rise in the price level, which is expected to come about partially as the result of the emergency banking legislation. It is held to represent a mild inflationary movement that will be controlled, but at the same time develop higher prices in the near future.

Signs of this attitude are expressed in a number of moves made in the trade. One steel company has circularized consumers, who have been told that "We believe the cloud of fear is lifting and a more normal volume of business will soon be in evidence." Some sheetmakers are quoting new buyers at current prices, which are made subject to immediate acceptance. Melters of pig iron are manifesting more interest and in instances are asking, but not receiving, protection until September at prevailing quotations. This is one of the indications that purchasers of foreign materials are becoming more concerned over the effect of the gold embargo. They apparently believe that, if maintained very long, it will increase prices of imported supplies. By some it is believed such a situation will turn at least a portion of these buyers to domestic sources of supply.

The lifting of the bank holiday has already pretty well restored normal business and in a few cases released deferred shipments, though these were relatively small. Salesmen also have been returned to the road.

With the lighting of two additional open-hearth furnaces in eastern Pennsylvania yesterday, steelworks operations have risen one point to 11 per cent. An eastern Pennsylvania plant put on a structural shape mill today. One maker reports that March business so far is about 15 per cent under that of February. The latter month showed a gain of 50 per cent over January.

Pig Iron

Moderate improvement has developed in inquiry for pig irons. Melters are beginning to show more interest in anticipation of a rise in prices. Some are asking, but are being refused, protection until September at current levels. An Ohio consumer is inquiring for 500 tons of 0.50 copper-bearing, low-phosphorous iron. Im-

ports of pig iron into Philadelphia in February totaled about 1950 tons, of which approximately 1800 tons came from India. During the past week imports at this port included 75 tons of German ferromanganese, while Baltimore received 300 tons of ferromanganese and 1017 tons of Royal Dutch iron. Ferromanganese is quoted at \$61, Atlantic seaboard.

Plates, Shapes and Bars

The Reading Railroad has distributed an additional 500 tons of plates among five makers in this district. The material is to be used in connection with the carrier's car repair program, which was expanded recently. The Concrete Steel Co. has been awarded 900 tons of reinforcing bars for the Philadelphia Naval Hospital, and E. T. Edwards was awarded 800 tons of reinforcing bars for a sewage disposal plant at Lancaster, Pa. Makers are trying to establish reinforcing bars at 1.55c., Pittsburgh, and 1.86c., Philadelphia. The market, however, is generally quotable at 1.60c., Philadelphia. Plates continue

to reflect an irregular tone. Some makers are quoting Coatesville, Pa., bases of 1.50c. on carlots, 1.40c. on less than carlots, and 1.30c. for 100 tons or more. Shapes are quoted at 1.60c., Eastern mill, and merchant bars are quoted at 1.60c., Pittsburgh.

Sheets

The tone of the market has become firmer, and makers consider that the second-quarter prices recently announced have become well established, and think higher levels may develop soon. Some makers are quoting unprotected consumers at current prices subject to immediate acceptance. The temporary shutdown of automobile body-building plants, due to bank holidays, held up shipments of sheets and strip, but releases again are being received by mills.

Imports

The following iron and steel imports were received here last week: 1060 tons of pig iron from British India, and 10 tons of bearing bars and seven tons of steel wire from Sweden.

Scrap

There is a feeling among dealers that prices will advance, and some are asking higher levels. However, others are quoting old levels without being able to move tonnage. Some mills are well stocked with old material and continue to hold up shipments.

Columbia Steel Co. Low on Part of San Francisco-Oakland Bridge

SAN FRANCISCO, March 13.—Columbia Steel Co., subsidiary of the United States Steel Corp., is the low bidder for three of the major contracts on the San Francisco-Oakland bridge. Its low combination bid of \$13,732,471 was for the San Francisco-Yerba Buena Island superstructure (contract No. 6), involving approximately 62,000 tons of structural steel, 1100 tons of reinforcing bars and 2100 tons miscellaneous steel, and for the San Francisco-Oakland superstructure cables (contract No. 6A), which requires 18,700 tons of cable wire and 830 tons of cable castings. Columbia was also low bidder at \$8,798,096, on the East Bay superstructure contract (contract No. 7), which requires approximately 50,675 tons of structural steel, 1100 tons of reinforcing bars and 8300 tons of miscellaneous steel.

No contracts will be awarded until bids have been taken March 29 on the last contract, the contract for the San Francisco anchorages, at which time the figures will be placed before the Reconstruction Finance Corp., to comply with the condition that the bridge must be constructed for not more than \$62,000,000. The

Columbia Steel Co. has announced that if it is awarded the above contracts it will not only greatly enlarge its fabricating plant at Pittsburg, Cal., but will also build a wire drawing mill for the cables, the first on the Pacific Coast.

Bridge Builders, Inc., with a bid of \$4,495,854, was low on the East Bay substructure (contracts No. 4 and No. 4A), which requires approximately 1140 tons of reinforcing bars, 165 tons of structural steel and 100 tons of miscellaneous steel. Bridge Builders, Inc., which holds the contract on the Golden Gate bridge for the anchorages and approach span piers, is a corporation composed of seven different companies.

The Transbay Construction Co. was low on the West Bay substructure (contract No. 2), which requires 1900 tons of reinforcing bars, 150 tons of structural steel and 225 tons of timber fastenings. The low bid on all contracts to date has been nearly \$5,000,000 below the engineers' estimates, so that it is quite possible that when all bids are in the bridge may be built for \$50,000,000, or \$12,000,000 less than the amount underwritten by the Federal Government. By

June it is hoped that 1600 men will be at work on the bridge or in the plants; this number will increase to 9000 the second year, and to 12,300 at the peak of construction. Only men who have resided in the district for at least one year will be employed on the bridge.

A survey of pending steel tonnages shows that Federal buildings on the Pacific Coast on which bids have been taken or for which appropriations are available will require at least 11,152 tons of structural steel and 1030 tons of reinforcing bars. Post-offices, for which general contracts have been placed, but for which steel contracts have not been reported include: San Jose, Cal., 330 tons reinforcing bars; Visalia, Cal., 160 tons structural; Yuma, Ariz., 200 tons structural; San Diego, Cal., 492 tons structural. The general contract on the Federal Building at San Francisco, involving 4000 tons of structural steel and 700 tons of bars, has not yet been placed. Postoffices for which funds are available but for which bids have not been taken include: Phoenix, Ariz., 800 tons structural; Ventura, Cal., 100 tons structural; Van Nuys, Cal., 100 tons structural; San Pedro, Cal., 300 tons structural; Los Angeles, Federal building and postoffice, 8000 tons structural; Spokane, Wash., 1000 tons structural. The above items do not include tonnages in any buildings requiring less than 100 tons or a number of contemplated postoffices on which estimates of steel tonnages are not available.

New England Expects Foundry Melt to Expand

BOSTON, March 14.—Pig iron sales have been a little larger the past few days, but the aggregate tonnage involved was well below 500 tons. About 90 per cent of New England foundries closed as a result of the bank holiday. There are indications the melt will shortly begin to expand owing to an influx of orders booked by large users of castings. Reports of new business by the General Electric Co., Pittsfield, Mass., are especially gratifying. Pig iron stocks in yards of the largest melters are ample for some time, but the average small and medium-sized foundry has little iron on hand.

The unwillingness of a majority of small scrap dealers and manufacturing plants to accept checks the past week dried up what little activity there was in old material. The firmer price trend in Pennsylvania prices is not reflected here. The spread between prices at Pittsburgh and New England shipping points is widening. Dealers believe it will shortly be possible to ship material to Pennsylvania consuming points.

New York Steel Trade Confident of Early Recovery From Slump

Business Badly Hit During Holiday—Steel Companies Will Book Second Quarter Contracts at Present Prices

NEW YORK, March 14.—Steel business in this area was badly hit by the banking holiday, though a few companies report that their decline in tonnage was less than was expected. During the first two or three days of last week buying was almost at a standstill, but there was some revival late in the week, but not enough to make a satisfactory total.

With the reopening of banks, following the passage of emergency legislation, confidence has gained. It is expected that the volume of steel business will quickly recover the ground that has recently been lost. Interest is marked among both buyers and sellers as to the probable effect on prices of inflationary tendencies in currency. Although a strengthening of steel prices is a distinct possibility, no outright advances in the immediate future are looked for. Steel companies are willing to book second quarter contracts at current prices and have thus informed some customers who have inquired for second quarter coverage. If a generally higher level of prices is to come, it is believed that raw materials, including pig iron and scrap, will be affected much sooner than finished steel.

Pig Iron

Sentiment in this market has improved perceptibly. Though no immediate expansion in consumption is expected, buying interest is gaining on the impetus of constructive legislation and the return of many banks in this district to normal functioning. Interest in forward requirements is particularly improved. Two consumers here are considering purchases of round lots, and a melter outside the metropolitan area is reported to be in the market for 2000 tons for extended delivery. Trading in the past week was naturally retarded by the bank holiday. Bookings for the week fell to only 500 tons from 900 tons in each of the two preceding periods. Prices show evidence of firming at recent nominal levels.

Reinforcing Bars

Fresh inquiry is still slow in appearing. Activity is sustained, however, by prospective lettings of a substantial aggregate tonnage of bars for road work in New Jersey. About 150 tons will be required soon for two incinerators in New York. Awards during the past week included about 1700 tons for Treasury Building vaults at Washington, and 268 tons for prison buildings at Woodbourne, N. Y. Stock lengths in normal quantities are posted at 1.50c. a lb., Pittsburgh, Cleveland or Buffalo, while cut

lengths for shipment out of New York warehouse are quotable at a base of 1.65c., Pittsburgh. Price concessions on major tonnages have not entirely disappeared, although efforts are being made to stabilize the Pittsburgh base.

Scrap

With export loading dominating activity, very little confusion attended the cessation of bank operations last week. Brokers with large export orders for No. 1 and No. 2 steel are actively bidding for material. Accumulation of these grades at New York continues, while at Boston 7000 tons of No. 1 and rail steel are being gathered for early consignment to Japan. News that England has lifted her embargo on shipment of "war materials" to Japan has relieved the tension here. Despite recent talk concerning the purposes for which Japan is taking steel scrap, a leading factor here contends that much of American scrap trade with Japan is a natural outgrowth of accumulated demand following a two-year lull in steel operations there. Recently, industry in Japan, it is pointed out, has been spurred principally by inflationary forces, and not by martial activities. With military operations waning in the Far East, it is contended, steel demand for industrial requirements will be sustained, with a concomitant demand for American steel scrap.

Cincinnati Trade Expects Firmer Pig Iron Prices

CINCINNATI, March 14.—Except for a purchase of 450 tons of Northern iron for shipment to a southern Ohio consumer the past week, fresh bookings of district furnace representatives were negligible. Total tonnage including this one purchase was about 600 tons. The banking situation has become subordinated, since the current demand has shown no reaction, consumers continuing to purchase iron only for immediate needs. Prices on both Northern and Southern iron are unchanged, but talk of firmer quotations is heard. Shipments of pig iron are at about the February rate.

Scarcity of scrap in the open market is tending to make prices firmer, and dealers expect any tonnage order to put prices at higher levels. Temporary restrictions on shipments because of the banking holiday caused movement of scrap to decline the past week. Buying for local consumption was confined to small lots and few of them.

Cleveland Steel Business Cut By Automobile Plant Shutdowns

Ingot Output Down to 17 Per Cent, Decline of Three Points—
Banking Situation Still Restricting General Buying

CLEVELAND, March 14.—With the shutting down of several automobile plants in Michigan and the suspension of steel shipments to these plants, the demand for finished steel has further declined, and this is being reflected in a reduction in schedules of northern Ohio mills and curtailment of operations by automobile parts makers in this territory. Orders from other sources for small lots are coming out in moderate volume.

Ingot output in Cleveland has declined three points this week to 17 per cent of capacity, the Otis company having shut down the one furnace that it has been operating recently.

Interest locally is still largely centered in the banking situation, which has materially improved by the re-opening this week of several Cleveland banks. However, two of the largest local banks are still operating under limited withdrawal restrictions, pending the formation of plans for reorganization. Consequently, little, if any, financial relief has been extended to metal-working plants. However, a few others that shut down when the bank holiday was declared have reopened in a limited way.

No business is coming from the railroads and expected rail inquiries evidently have been deferred because of the banking situation. Consumers of steel and pig iron are showing considerable interest in second quarter contracts because they think that currency inflation may lead to higher prices. Many inquiries for sheets, strip steel and bars have come out for the second quarter and quite a few consumers will be glad to place blanket orders for more extended deliveries at current prices, although producers will not make commitments beyond the quarter.

Present prices of 1.45c., Pittsburgh, for hot-rolled strip, 1.80c., Cleveland, for cold-rolled strip, and 2.45c. to 2.65c. for alloy steel bars have been reaffirmed for the coming quarter, and some sheet and strip tonnage has been taken for that delivery. While the price of merchant steel bars for the coming quarter has not been formally announced, some business has been taken at the current 1.65c., Cleveland, price, which is being re-established. Plates and shapes probably will be reaffirmed at 1.60c., Pittsburgh.

Pig Iron

More inquiry has come out in the past few days than during any week

for several months. Some consumers feel that the issuance of new currency will cause a mild inflation with a possible price advance and that it is a good time to buy pig iron for future requirements. A Muncie, Ind., melter is inquiring for 1500 tons of malleable iron, another Indiana melter for 2000 tons, an Ohio consumer for 1000 tons and a Pennsylvania foundry for 2300 tons, the last three inquiries being for foundry iron. One inquiry is for the remainder of the year and one for delivery through the third quarter. Some producers seem inclined to sell through the third quarter at ruling prices but not for more extended delivery. Shipments declined about 10 per cent the past week, evidently because of the banking situation.

Iron Ore

Dock shipments in February declined to 26,239 tons from 31,144 tons in January. February shipments last year were 42,964 tons. The dock balance March 1 was 5,105,339 tons, compared with 5,767,060 tons on the same date a year ago.

Strip

Some of the producers have reaffirmed for the second quarter the ruling price of 1.45c., Pittsburgh, for hot-rolled strip and the present minimums of 1.80c., Cleveland and Pittsburgh, for cold-rolled strip and 2.55c. for fender stock. Shipments to some of the leading consumers in the automotive field are still entirely suspended and very little new business is being placed.

Bars, Plates and Shapes

Activity in the building field is limited to private work requiring small lots of structural steel. The date for Ohio bridge awards, which were held up by the closing of banks, has not been set. The pending jobs will require 200 tons of reinforcing bars and a quantity of structural steel. Demand for merchant bars is limited to small lots from miscellaneous sources.

Sheets

Orders from the automobile companies are quite generally suspended, and shipments to that industry during the past week were very light. Little improvement is looked for until some of the automobile plants that are now shut down resume operations. However, with the improvement in the banking situation a better volume of miscellaneous orders is

looked for this week. Most producers have adopted the new prices and size and gage extras. Producers are not disposed to make large commitments for extended shipments at present prices, as they see a possibility of higher prices later in the year. The Cleveland post office will require 100 tons of full finished sheets, for which an inquiry is pending.

Warehouse Business

Warehouses on Monday revised prices on cold-finished bars by eliminating the 50c. per 100 lb. extra for flats and squares, thus following the mill practice of quoting the same price for all shapes.

Scrap

A Youngstown district consumer bought a moderate tonnage of heavy melting steel during the week but is not taking shipments. With the improvement in the banking situation, some local activity is expected this week, which may clarify the price situation. While quotations are unchanged, dealers look for a firmer market and are not inclined to sell much scrap at ruling prices.

Birmingham Business Loss Less Than Expected

BIRMINGHAM, March 14.—Although there were substantial reductions in shipments and bookings for pig iron and steel last week because of the banking holiday, the effects were not as drastic as might have been expected. In the face of adverse conditions, some foundries maintained their customary schedules and called for their customary tonnage. Practically all operations, however, were based on business already booked and in the process of manufacture. New business was small, but toward the end of the week was slightly better. Several pipe lettings were postponed last week, as bidders were unable to post certified checks. No changes have occurred in pig iron quotations or furnace operations. The base price for the Southern market stands at \$11. Two furnaces are in blast.

Steel

The steel market experienced the same pressure as that on pig iron. Manufacturers and fabricators, with work on hand, continued to take needed material, but there was a scarcity of new tonnage. Mill and open-hearth operations of the two steel producers in this district were about the same last week as during the preceding week, and not much change is indicated for the current week. Five open-hearths are active, but all may not be continued through the entire week.

Fabricated Structural Steel

Lettings Again Decline—New Projects in Good Volume

AWARDS of 6600 tons the past week were mostly for public work and included no tonnage of large size. A State bridge at Owego, N. Y., requires 1230 tons and a mill building at Detroit will take 1200 tons. New projects of 22,600 tons compare with 1600 tons last week and 7450 tons two weeks ago. The largest inquiries are 8000 tons for a Federal building at Los Angeles and 6000 tons for radio towers for the Department of Commerce, Washington. Plate lettings total 3200 tons. Awards follow:

NORTH ATLANTIC STATES

Oxford, Mass., 125 tons, State bridge, to Boston Bridge Works, Inc.

Revere, Mass., 100 tons, State bridge, to Boston Bridge Works, Inc.

Yeadon, Pa., 300 tons, school, to Robinson Iron & Steel Co., Philadelphia.

Mahanoy City, Pa., 100 tons, high school, to Lehigh Structural Steel Co.

Philadelphia, 240 tons, factory for Collins & Aikman, to Belmont Iron Works.

Fernwood, Pa., 300 tons, high school, to Robinson Iron & Steel Co., Philadelphia.

Harrison, N. J., 360 tons, building for National Oil Products Co., to Harris Structural Steel Co.

Owego, N. Y., 1230 tons, State bridge No. 1A, to American Bridge Co.

Washington, 560 tons, vaults for United States Treasury, to McClintic-Marshall Corp.

Washington, 330 tons, Phelps Trade School, to Dietrich Brothers.

CENTRAL STATES

Negley, Ohio, 870 tons, viaduct for Montour Railroad, to McClintic-Marshall Corp.

Detroit, 1200 tons, mill building for Naugle & Townsend, Inc., to R. C. Mahon Co.

State of Nebraska, 325 tons, bridges, to Pittsburgh-Des Moines Steel Co.

WESTERN STATES

State of California, 530 tons, San Diego River bridge, to Consolidated Steel Corp.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Schenectady, N. Y., 150 tons, post office.

Milford, N. J., 800 tons, State highway bridge; bids this week.

Washington, 6000 tons, radio towers for Department of Commerce.

The SOUTH

Jacksonville, Fla., 535 tons, North Main Street State viaduct.

CENTRAL STATES

Rock Island Railroad, 300 tons, change in bridge across Illinois waterway.

Winneconne, Wis., 500 tons, Wolf River bridge with one 70-ft. draw span; bids about May 1.

Duluth, Minn., 250 tons, hospital; bids to be taken March 21.

WESTERN STATES

Alameda, Cal., 1000 tons, buildings at Benton Field.

Los Angeles, 200 tons, chemistry building for University of California; bids under advisement.

Los Angeles, 8000 tons, Federal building and post office.

Van Nuys, Cal., 100 tons, post office.

San Pedro, Cal., 300 tons, post office.

Arcadia, Cal., 900 tons, grandstand.

Hyperion, Cal., 125 tons, pier.

Spokane, Wash., 1000 tons, post office; bids soon.

Oakland, Cal., 1000 tons, bridge at Twenty-third Avenue.

San Francisco, 1500 tons, County jail; bids March 29.

HAWAII

Pearl Harbor, 150 tons, extension to store house, bids April 5.

FABRICATED PLATE

AWARDS

Wanakah, N. Y., 100 tons, 250,000-gal. elevated tank, to Pittsburgh-Des Moines Steel Co.

Clewiston, Fla., 250 tons, 2,000,000-gal. tank for Dunbar Molasses Co., to Chicago Bridge & Iron Works.

Milwaukee, 200 tons, Pabst Brewing Co., to Lakeside Bridge & Steel Co. and the Heil Co.; additional 300 tons to be placed later.

Los Angeles, County, Cal., 400 tons, two 500-hp. boilers, to Consolidated Steel Corp.

San Francisco, 250 tons, Irvington tunnel, to American Concrete & Steel Pipe Co.

San Diego, Cal., 2000 tons, floating drydock for United States Navy, to Dravo Contracting Co.

NEW PROJECTS

Philadelphia, 100 tons, caissons for Naval hospital; revised from 300 tons.

Denver, 2000 tons of steel pipe; bids opened March 15.

Los Angeles, 400 tons, 24- to 30-in. welded steel pipe; bids under advisement.

Cast Iron Pipe

Cincinnati, 2000 tons, United States Pipe & Foundry Co., low bidder.

Bethel, Ohio, will require six miles of 2- to 8-in. pipe, 10,000-gal. elevated steel storage tank and a pumping station for a new water-works system. A loan of \$35,000 has been approved by the Reconstruction Finance Corp.

Kansas City, Mo., let contracts for about 21,600 ft. of 20-in. centrifugal pipe to United States Pipe & Foundry Co., National Cast Iron Pipe Co., and American Cast Iron Pipe Co.

Los Angeles has awarded 3323 tons of 8-in. class 250, to American Cast Iron Pipe Co., National Cast Iron Pipe Co., and United States Pipe & Foundry Co.

Red Bluff, Cal., has taken bids on 197 tons of 12-in. pipe.

Reinforcing Steel

Awards 5950 Tons—New Projects 500 Tons

Saratoga Springs, N. Y., 100 tons, State administration building, to Joseph T. Ryerson & Son, Inc.

Woodbourne, N. Y., 268 tons, prison, to Joseph T. Ryerson & Son, Inc.

Washington, 1700 tons, Treasury Building vaults, to Kalman Steel Corp.

Philadelphia, 900 tons, Naval hospital, to Concrete Steel Co.

Lancaster, Pa., 800 tons, sewage disposal plant, to Edwards Steel Co., Columbia, Pa.

Lexington, Ky., 1100 tons, United States Narcotic Hospital to Knoxville Iron Co.

State of Illinois, 275 tons, road work; 100 tons to Calumet Steel Co., 175 tons to various bidders.

Denver, 380 tons, Boulder Canyon project, to Pacific Coast Steel Corp.

Knights Landing, Cal., 112 tons, bascule bridge, to Pacific Coast Steel Corp.

Panama Canal, 288 tons, specification 2827, to Gulf States Steel Co.

NEW REINFORCING BAR PROJECTS

New York, 150 tons, two incinerators.

Los Angeles County, Cal., 100 tons, bridge at Second Street over San Gabriel River; bids April 20.

Taft, Cal., 150 tons, mausoleum; bids March 17.

Oakland, Cal., 100 tons, bridge at Twenty-third Avenue.

Pipe Lines

Newton, N. J., asks bids until March 21 for 8676 ft. of corrugated copper-bearing pure iron culvert pipe, 10 to 34-in. diameter, 8-ft. lengths.

Henson Gas Co., Huntington, W. Va., plans extensions in natural gas steel pipe lines.

Phillips Petroleum Co., Bartlesville, Okla., has let contract to Kelly-Dempsey Engineering Co., Hunt Building, Tulsa, Okla., for 8-in. crude oil steel pipe line from Oklahoma City to Cushing, Okla., about 200 miles, for crude oil service.

Texas Pipe Line Co., Houston, Tex., has acquired Coastal Pipe Line Co., Corpus Christi, Tex., operating steel pipe line from Sacket, Tex., oil field to Corpus Christi, and will make connections with system for crude oil service.

Clark Pipe Line Co., Oklahoma City, is considering 8-in. crude oil pipe line for supply from point near Oklahoma City to Kendrick, Okla., to cost over \$125,000.

Freight Surcharges To Be Continued to Sept. 30

WASHINGTON, March 14. — The Interstate Commerce Commission in a decision announced yesterday granted permission to the railroads to continue collecting the present emergency freight rate surcharges until Sept. 30, 1933. They were to have expired on March 31.

The commission, however, made two exceptions in its order. It declared that the surcharge on non-ferrous ores and concentrates must not be continued after March 31, and that more than one charge of 6c. a ton in connection with the transshipment of Lake cargo coal from the originating mine to the ultimate destination would not be permitted after the same date. Under the present arrangement the railroads have applied the coal surcharge both on shipments from the mines to the Lakes and again on the transshipments beyond.

The decision of the commission on the continuance of the freight rate surcharges was not unanimous. Vigorously dissenting opinions were entered by Commissioners Eastman, McManamy, Porter and Tape.

Non-Ferrous Metals Unite in Broad Price Advance

Copper Rises 3/4c. a Lb.; Lead and Zinc up \$7 a Ton;
Tin Higher on Strong Sterling Exchange

NEW YORK, March 14—Spurred to a brisk pace by recent favorable developments, the domestic copper market last week scored its most definite advance since October. Electrolytic on Thursday sold at 5.50c. a lb., delivered Connecticut, and a secondary advance on Saturday brought it to 5.75c. A satisfactory volume of buying was experienced on the rise, with requirements spread evenly through April. Though some buying undoubtedly represented covering against further price advances, most of it was for actual needs. Shipping releases against standing orders have been freer, indicating a slight pick-up in consumption. Primary producers are still holding at 6.25c., Connecticut, and, according to present indications, will not budge from that position, believing that higher values for copper are in the offing. For the greater part of the week, dealings abroad were based on sterling and francs. With resumption of sterling exchange quotations yesterday, the dollar price on the Continent ranged from 5.37 1/2c. to 5.50c., c.i.f. usual ports. European buyers have been covering rather freely the past week. Lake copper has enjoyed a substantial advance to 5.75c., delivered New York.

Tin

This market was largely a nominal affair last week. Offerings in that period were on a currency basis, with sellers asking stiff premiums in the absence of sterling exchange. On March 8, 9 and 10 spot Straits was nominally quoted at 25.50c., but few buyers sought to cover at that level. Sales volume for the week was consequently pretty thin. With sterling quotations reinstated yesterday, the New York price for spot Straits was established at 24c. a lb. A sizable demand that had been accumulating during the bank closures was released, and bookings of nearby tin were in good volume. Buying interest narrowed today, when spot Straits advanced to 24.12 1/2c. on a rise in sterling to \$3.45. With tin consumption on the whole reflecting diminishing tendencies, further trends in tin prices will probably hinge chiefly on the action of sterling. Good gains were made in the London market during the week. London postings this morning were £149 5s. a ton for spot standard, £149 17s. 6d. for future standard, and £155 for spot Straits. The Singapore also reached higher ground, ad-

vancing nearly £4 for the week to £154. United Kingdom warehouse stocks fell 111 tons last week to 28,160 tons.

Lead

On one of the broadest buying movements that has been experienced in more than a year the price of lead swung upward last week for a net gain of \$7 a ton. Though buying had subsided somewhat at the outset of the current week, the market is strong at 3.22 1/2c. a lb., St. Louis, and 3.35c., New York. Most encouraging to the trade was the diversified character of demand over the past week, with practically all lead-consuming lines participating. Replenishment of supplies that ordinarily should have taken place in the past two months accounted largely for the sudden flood of buying. Covering was divided evenly between March and April. A fair amount of inquiry for April is still in evidence, so that a moderate volume of business for the remainder of March is not improbable.

Zinc

Sharp curtailment of ore output and shipments in the Joplin district created a rather stringent situation with respect to prime Western zinc. Smelters were generally reluctant to offer metal because of their inability to obtain ore at equitable prices. As a result, zinc prices throughout the week were not clearly definable. Values, however, in the absence of selling pressure and in concert with advances in other metals rose \$7 a ton to the current level of 3.20c. a lb., East St. Louis, or 3.57c., New York. Buying interest cannot be said to match that in copper and lead, and little business was transacted during the week. Only a fair demand for April metal is in evidence.

British Pig Iron and Steel Output Gains

LONDON, ENGLAND, March 14. (By Cable)—Output of pig iron and steel in the United Kingdom in February gained over that of January. The pig iron total was 270,800 tons, or about 9671 tons a day against 9207 tons daily in January. Output of steel ingots was 482,700 tons, which was considerably above the January total, not considering the fact that January was a longer month.

Monthly totals for 1932 and 1933 follow:

	Pig Iron	Steel Ingots
1932		
Jan.	332,400	429,700
Feb.	318,100	480,600
March	335,600	462,800
April	316,900	433,300
May	315,300	416,900
June	311,400	459,300
July	292,600	430,300
Aug.	259,400	361,500
Sept.	260,400	430,300
Oct.	275,600	438,500
Nov.	267,700	473,800
Dec.	284,500	430,400
	3,569,900	5,247,400
1933		
Jan.	286,600	444,400
Feb.	270,800	482,700

The Week's Prices. Cents Per Pound for Early Delivery

	March 8	March 9	March 10	March 11	March 13	March 14
Electrolytic copper, N. Y.*..	5.00	5.25	5.25	5.50	5.50	5.50
Lake copper, New York.....	5.25	5.50	5.50	5.75	5.75	5.75
Straits tin, Spot, N. Y.....	25.50	25.50	25.50	...	24.00	24.12 1/2
Zinc, East St. Louis.....	2.80	3.00	3.00	3.12 1/2	3.15	3.20
Zinc, New York	3.17	3.37	3.37	3.49 1/2	3.52	3.57
Lead, St. Louis	3.12 1/2	3.12 1/2	3.22 1/2	3.22 1/2	3.22 1/2	3.22 1/2
Lead, New York	3.25	3.25	3.35	3.35	3.35	3.35

*Refinery quotations price 1/4c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.25c. a lb., New York.
Brass ingots, 85-5-5-5, 6.00c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig.....	26.00c. to 27.00c.
Tin, bar.....	28.00c. to 30.00c.
Copper, Lake.....	7.50c. to 8.50c.
Copper, electrolytic.....	7.25c. to 8.25c.
Copper, casting.....	7.00c. to 8.00c.
*Copper sheets, hot-rolled.....	13.62 1/2c.
*High brass sheets.....	11.00c.
*Seamless brass tubes.....	13.25c.
*Seamless copper tubes.....	12.37 1/2c.
*Brass rods.....	8.50c.
Zinc, slabs.....	4.37 1/2c. to 4.87 1/2c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig....	3.75c. to 4.25c.
Lead, bar.....	5.25c. to 6.25c.
Lead, sheets.....	7.00c.
Antimony, Asiatic.....	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	16.00c.
Solder, 1/2 and 1/2.....	15.50c. to 16.50c.
Babbitt metal commercial grade.....	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig.....	28.25c.
Tin, bar.....	30.25c.

Copper, Lake.....	7.00c.
Copper, electrolytic.....	7.00c.
Copper, casting.....	6.75c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig....	4.00c. to 4.50c.
Lead, bar.....	7.50c.
Antimony, Asiatic.....	8.50c.
Babbitt metal, medium grade....	16.50c.
Babbitt metal, high grade....	32.00c.
Solder, 1/2 and 1/2.....	17.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	4.00c.	4.625c.
Copper, hvy. and wire.....	3.75c.	4.50c.
Copper, light and bottoms.....	2.75c.	3.75c.
Brass, heavy.....	1.750c.	2.375c.
Brass, light.....	1.50c.	2.00c.
Hvy. machine composition.....	2.75c.	3.25c.
No. 1 yel. brass turnings.....	2.25c.	2.75c.
No. 1 red brass or compos. turnings....	2.50c.	3.00c.
Lead, heavy.....	2.375c.	2.75c.
Zinc.....	1.50c.	1.75c.
Cast aluminum.....	3.75c.	5.00c.
Sheet aluminum.....	8.00c.	9.75c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.I.F. Pacific ports	2.10c.

Billet Steel Reinforcing

(as quoted by distributors)	Base per Lb.
F.o.b. P'gh mills, 40, 50, 60-ft.	1.40c.
F.o.b. Birmingham, mill lengths	1.65c.
F.o.b. Cleveland	1.40c.

Ball Steel

F.o.b. mills, east of Chicago dist.	1.30c.
F.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.85c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.5635c. to 1.7135c.
F.o.b. Coatesville	1.45c. to 1.60c.
F.o.b. Sparrows Point	1.45c. to 1.60c.
Del'd New York	1.645c. to 1.795c.
C.I.F. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	2.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.I.F. Pacific ports (standard)	2.10c.
C.I.F. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)	
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Alloy Quantity Bar Base, S.A.E. Series Numbers	2.45c. to 2.65c. per Lb.	Alloy Differential per 100 Lb.
2000 (1/2% Nickel)		30.25
2100 (1 1/2% Nickel)		0.55
2300 (3/4% Nickel)		1.50
2500 (5% Nickel)		2.25
3100 Nickel Chromium		0.55
3200 Nickel Chromium		1.35
3400 Nickel Chromium		3.80
3600 Nickel Chromium		3.20
4100 Chromium Molybdenum (0.18 to 0.25 Molybdenum)		0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)		0.70
4400 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)		1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)		0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)		0.45
5100 Chromium Spring Steel		0.20
6100 Chromium Vanadium Bar		1.20
4100 Chromium Vanadium Spring Steel		0.95
9250 Silicon Manganese Spring Steel (flat)		0.25
Rounds and Squares		0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 3/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars, eastern Michigan	1.90c.
Shifting, ground, f.o.b. mill	1.95c.
1 1/2 in. x 3.00c.	
1-3/16 to 1 1/4 in. x 2.50c.	
1-9/16 to 1 1/2 in. x 2.35c.	
1-15/16 to 2 in. x 2.20c.	
2-15/16 to 2 1/2 in. x 2.05c.	

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.40c.
No. 10, f.o.b. Chicago mill	1.50c.
No. 10, del'd Philadelphia	1.71c.
No. 10, f.o.b. Birmingham	1.55c.
No. 10, c.I.F. Pacific Coast ports	2.17 1/2c.

Hot-Rolled Annealed

No. 10, Pittsburgh	1.55c.
No. 10, Chicago mills	1.65c.
No. 10, Birmingham	1.70c.
No. 10, Pacific Coast ports	2.32 1/2c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.00c.
No. 24, f.o.b. Chicago mills	2.10c.
No. 24, del'd Philadelphia	2.31c.
No. 24, f.o.b. Birmingham	2.15c.
No. 24, c.I.F. Pacific Coast ports	2.85c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 SHEET, f.o.b. Pittsburgh	1.90c.
No. 10 SHEET, f.o.b. Chicago mills	2.00c.
No. 10 SHEET, del'd Philadelphia	2.21c.

Light Cold-Rolled

No. 20 SHEET, f.o.b. Pittsburgh	2.30c.
No. 20 SHEET, f.o.b. Chicago mills	2.40c.
No. 20 SHEET, del'd Philadelphia	2.61c.

Note: Automobile body stock and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

No. 24 f.o.b. Pittsburgh	2.60c.
No. 24 f.o.b. Chicago mills	2.70c.
No. 24, del'd Philadelphia	2.91c.
No. 24 f.o.b. Birmingham	2.75c.
No. 24, c.I.F. Pacific Coast ports	3.25c. to 3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.75c.
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Vitreous Enameling Sheet

No. 10, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20, f.o.b. Pittsburgh	2.90c. to 3.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c.

Tin Plate

Standard cokes, f.o.b. P'gh district	Base per Box
mill	\$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh) (Per Package, 20 x 28 in.)	Base per Box
8-lb. coating I.C.	\$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I.C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

	Base per Lb
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in., Chicago	1.45c. to 1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh	1.80c. to 2.00c.
F.o.b. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
F.o.b. Worcester	2.60c. to 2.10c.
Fender stock, No. 20 SHEET, Pittsburgh or Cleveland	2.55c. to 2.65c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

To Manufacturing Trade

Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

	Base per Keg
Standard wire nails	\$1.85
Smooth coated nails	1.85
Galvanized nails	1.85
	Base per 100 Lb.
Smooth annealed wire	\$2.25
Smooth galvanized wire	2.60
Polished staples	2.55
Galvanized staples	2.80
Barbed wire, galvanized	2.85

Woven wire fence No. 9 gauge, base column, per net ton.....\$50.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld					
Steel			Wrought Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/2 to 3/4	51%	28 1/2	1/2 to 3/4	+95	+142 1/2
3/4 to 1	57	34 1/4	3/4 to 1	+5	+20 1/2
1 to 1 1/2	62	49 1/2	1 to 1 1/2	28	10 1/2
1 1/2 to 2	65	55 1/2	1 1/2 to 2	33	16 1/2
2 to 3	67 1/2	57 1/2	2 to 3	36	20 1/2
Lap Weld					
2	61	50 1/2	2	26	18 1/2
2 1/2 to 3	64 1/2	54	2 1/2 to 3	35	22
3 to 4	68	59 1/2	3 to 4	36	24
4 to 6	70	64	4 to 6	34	21 1/2
6 to 8	72	68 1/2	6 to 8	31	19 1/2
8 to 10	74	72 1/2	8 to 10	31	19 1/2
10 to 12	75	74 1/2	10 to 12	31	19 1/2

Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furance, f.o.b. Connellsville	\$1.75 to \$2.00
Foundry, f.o.b. Connellsville	2.50 to 4.25
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.50
Foundry, by-product, Philadelphia, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.00 to \$1.15
Mine run coking coal, f.o.b. W. Pa. mines	1.10 to 1.25
Gas coal, 1/4-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil	
Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.25c.
No. 5 industrial fuel oil	2.65c. to 2.75c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-heat Intermediate Duty Brick	\$35.00 to \$30.00
Penn.	35.00
Maryland	35.00
New Jer.	\$44.00 to 37.00
Ohio	35.00
Kentucky	35.00
Missouri	35.00
Illinois	35.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$42.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	35.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE	
	Per Net Ton
6-in. and larger, del'd Chicago	\$41.40
6-in., del'd Chicago	44.40
6-in., and larger, del'd New York	55.30
6-in., del'd New York	56.30
6-in., and larger, Birm'ham	53.90
4-in., Birmingham	36.00

Class "A" and gas pipe, \$3 extra.

VALLEY

Per Gross ton, f.o.b. Valley furnace:	
Basic	\$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.50
Malleable	\$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

CHICAGO

Per gross ton at Chicago furnaces:	
N't'n No. 2 fdy.	\$15.50
N't'n No. 1 fdy.	16.00
Malleable, not over 2.30 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent.	23.67
Beas. ferro-sil'n, 15 per cent.	23.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

St. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd	\$17.80 to 18.30
Southern No. 2 fdy., del'd	14.58
Northern malleable, del'd	17.80 to 18.30
Northern basic, del'd	17.80 to 18.30

Freight rates \$3c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.58 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:	
* Buffalo, No. 2, del'd east	\$17.41 to \$17.68
East Pa. No. 2 fdy.	14.02
East Pa. No. 2X fdy.	14.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.
* Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
N't'n fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N't'n No. 2 foundry	\$17.01 to 17.59
S't'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:	
N't'n No. 2 fdy. (local delivery)	\$15.00
S't'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent.	21.87
Stand. low phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:	
East Pa. No. 2	\$13.34 to \$13.84
East Pa. No. 2X	13.84 to 14.34
East Pa. No. IX	14.34 to 14.84
Basic (del'd east, Pa.)	13.50 to 14.00
Malleable	14.74 to 18.04
Stand. low phos. (f.o.b. east, Pa. furnace)	20.00 to 21.00
Cop. b'r'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

Pig Iron, Ores, Ferroalloys

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:	
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

NEW ENGLAND

Per gross ton delivered to most New England points:	
* Buffalo, sil. 1.75 to 2.25	\$19.05
* Buffalo, sil. 2.25 to 2.75	19.05
* Buffalo, sil. 1.75 to 2.25	17.41
* Buffalo, sil. 2.25 to 2.75	17.41
* Ala., sil. 1.75 to 2.25	15.64
* Ala., sil. 2.25 to 2.75	16.14

Freight rates: \$5.05 all rail from Buffalo, and \$3.41 to \$3.91 rail and water from Buffalo when \$1 barge and \$2 to \$2.50 New England freight rate are obtainable; \$5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.
† Rail-and-water rate.

CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

Contract price; spot quotation \$61.
Prices for lots of one carload or more; extras applied on less than carload lots.

Ferromanganese

Per Gross Ton	
Domestic, 80% seaboard	\$68.00
Foreign, 80% Atlantic or Gulf port, duty paid	61.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$24.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$74.50
50% (less carloads)	74.50
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Weland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10%	\$20.50
12%	21.00
14%	21.50
16%	22.00
18%	22.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6%	\$18.00
7%	18.50
8%	18.75
9%	19.00
10%	19.50
11%	20.00

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	\$94c.
Ferrotungsten, less carloads	\$1.00

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$8.50 to \$9.00
No. 2 heavy melting steel	7.25 to 7.75
No. 2 railroad wrought	8.50 9.00
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.25 to 8.75
Hand bundled sheet steel	7.25 to 7.75
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	8.50 to 9.50
Railr. knuckles and couplers	9.50 to 10.00
Rail. coil and leaf springs	9.50 to 10.00
Roller steel wheels	9.50 to 10.00
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.50 to 10.00
Low phos. punchings	10.00 to 10.50
Steel car axles	10.00 to 10.50

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$3.00 to \$5.50
Shoveling steel	5.00 to 5.50

Ferromanganese, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.50c.
Ferromanganese, 2% carbon	16.50c. to 17.00c.
Ferromanganese, 1% carbon	17.50c. to 18.00c.
Ferromanganese, 0.10%	19.50c. to 20.00c.
Ferromanganese, 0.06% carbon	20.00c. to 20.50c.
Ferromanganese, del. per lb. contained Va.	\$2.00 to \$2.50
Ferromanganese, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del. Mo.	80c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$30.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
3% carbon grade	86.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton	
Old range Bessemer, 51.5% iron	\$4.30
Old range, non-Bessemer, 51.50% iron	4.60
Mesabi Bessemer, 51.50% iron	4.60
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 65 to 68% iron, dry Spanish or Algerian	3c. to 8.50c.
Iron, low phos., Swedish, average 68% iron	8c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, 63% iron (nom.)	9c.
Manganese, Caucasian, washed 52%	52c.
Manganese, African, Indian, 50-52%	42c. to 52c.
Manganese, Brazilian, 46 to 48%	42c.

Tungsten, Chinese wolframite, duty paid \$10.00 |

Tungsten, domestic scheelite

\$8.00 to \$10.00

Chrome, 45% Cr₂O₃, crude, c.i.f.

Atlantic seaboard \$6.00 |

Chrome, 48% Cr₂O₃, c.i.f. Atlantic seaboard

\$6.00

*Quotations nominal in absence of sales

Fluorspar

Per Net Ton	
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	\$9.00 to \$9.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$11.00 to 11.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$10.00 to 10.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2% silicon, f.o.b. Illinois and Kentucky mines	\$9.00

Iron and Steel Scrap

Frogs, switches and guards	5.00 to \$5.50
Hydraulic comp. sheets	4.00 to 4.50
Drop forge flashings	4.00 to 4.50
No. 1 busheling	3.50 to 4.00
Roller carwheels	7.00 to 7.50
Railroad tires	8.00 to 8.50
Railroad leaf springs	7.75 to 8.25
Steel couplers and knuckles	4.50 to 5.00
Coil springs	8.25 to 8.75
Steel turnings (elec. fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	3.25 to 3.75
Short shoveling turnings	3.25 to 3.75
Machine shop turnings	3.00 to 3.50
Rolling rails	7.

No. 2 busheling	\$2.00 to \$2.30
Locomotive tires, smooth	7.50 to 8.50
Pipe and flues	1.25 to 1.75
No. 1 machinery cast	6.25 to 6.75
Cast automobile cast	7.25 to 7.75
No. 1 railroad cast	5.75 to 6.25
No. 1 agricultural cast	5.75 to 6.25
Stove plate	5.50 to 6.00
Grate bars	6.25 to 6.75
Grate shoes	6.00 to 6.50

*Relaying rails, including angle bars
*Mach. are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$6.50 to \$7.00
No. 2 heavy melting steel	5.00 to 5.50
No. 1 railroad wrought	4.00 to 4.50
Bundled sheets	4.50 to 5.00
Hydraulic compressed, new	4.00 to 4.50
Hydraulic compressed, old	3.50 to 4.00
Machine shop turnings	3.50 to 4.00
Heavy axle turnings	3.50 to 4.00
Cast borings	3.50 to 4.00
Heavy breakable cast	3.50 to 3.75
Stove plate (steel works)	3.50 to 3.75
No. 1 low phosph. heavy	10.00 to 10.50
Chapters and knuckles	8.00 to 8.50
Roller steel wheels	8.00 to 8.50
No. 1 blast furnace	8.00 to 8.50
Spec. iron and steel pipe	3.50 to 3.75
Steel axes	12.00 to 13.00
No. 1 forge fire	12.00 to 13.00
Cast iron car wheels	5.50 to 6.00
No. 1 cast	8.00 to 8.50
Cast borings (chem.)	8.00 to 9.00
Steel rails for rolling	8.00 to 10.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.25 to 6.50
Compressed sheet stamp-	6.00 to 6.50
ings	
Drop force flashings	4.00 to 4.50
Machine shop turnings	5.25 to 5.75
Short shoveling turnings	3.75 to 4.25
No. 1 busheling	5.25 to 5.75
Steel axle turnings	5.00 to 5.50
Low phosph. billet crops	10.00 to 11.00
Cast iron borings	3.75 to 4.25
Mixed borings and short	
turnings	
No. 2 busheling	3.75 to 4.25
No. 1 cast	4.50 to 4.75
Railroad grate bars	7.00 to 7.50
Stove plate	5.00 to 5.50
Rolls under 3 ft.	5.00 to 5.50
Old hydraulic comp. sheets	8.50 to 9.00
Rails for rolling	8.50 to 9.00
Railroad malleable	6.75 to 7.00
Cast iron car wheels	7.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.50 to 6.75
Scrap rails	6.00 to 6.50
No. 1 hydraulic comp. sheets	5.50 to 6.00
Drop force flashings	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Hy. steel axle turnings	5.50 to 6.00
Machine shop turnings	6.00 to 6.50
Knuckles and couplers	4.00 to 4.50
Roller steel wheels	9.00
Low phosph. billet crops	9.00
Short shov. steel turnings	9.00 to 9.50
Mixed borings and	
turnings	
Cast iron borings	3.75 to 4.25
No. 2 busheling	3.75 to 4.25
Steel car axles	10.00 to 11.00
No. 1 machinery cast	10.00 to 11.00
No. 1 cupola cast	9.50 to 10.00
Stove plate	8.50 to 9.00
Rolls 3 ft. and under	7.00 to 7.50
Cast iron car wheels	5.50 to 6.00
Railroad malleable	7.00 to 7.50
Chemical borings	7.00 to 7.50

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$7.00 to \$7.50
Scrap steel rails	7.00 to 7.50
Short shoveling turnings	4.00
Stove plate	6.00
Iron axes	6.00
No. 1 railroad wrought	9.00
Bundled sheets	4.50 to 5.00
No. 1 busheling	7.50 to 8.00
Tramcar wheels	8.50
Cast iron borings, chem.	8.50

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$5.50 to \$6.00
No. 1 heavy melting	4.50 to 5.00
No. 2 heavy melting	4.75 to 5.25
No. 1 locomotive tires	5.00 to 5.50
Stand-sec. rails	5.50 to 6.00
Railroad springs	6.00 to 6.50
Bundled sheets	2.00 to 2.50
No. 1 railroad wrought	5.00 to 5.50
No. 1 busheling	3.50 to 4.00
Cast iron borings and	
short shoveling turnings	
Rails for rolling	2.75 to 3.25
Machine shop turnings	6.75 to 7.25
Heavy turnings	2.00 to 2.50
Steel car axles	3.00 to 3.50
Drop iron bars	11.00 to 11.50
No. 1 railroad and trans.	4.00 to 4.50
Steel rails less than 3 ft.	3.50 to 4.00
Steel angle bars	7.00 to 7.50
Cast iron car wheels	6.00 to 6.50
No. 1 machinery cast	5.00 to 5.50
Railroad malleable	6.00 to 6.50
Stove plate	6.25 to 6.75
Relay rails, 60 lb. and	6.00 to 6.50

Relay rails, 60 lb. and over	\$20.00 to \$21.00
Agricult. malleable	4.00 to 4.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.00 to \$3.25
Scrap T. rails	2.50 to 2.75
Machine shop turnings	0.80 to 1.05
Cast iron borings	2.00 to 2.10
Bundled skeleton, long	2.00 to 2.10
Force flashings	3.00 to 3.50
Blast furnace scrap	3.00 to 3.50
Shafting	3.00 to 3.50
Steel car axles	9.50 to 10.00
Wrought pipe	9.00 to 9.50
Rails for rolling	4.00 to 4.25
Cast iron borings, chemical	4.50 to 5.00
Per gross ton delivered consumers' yards:	
No. 1 machinery cast	\$7.00 to \$7.50
Stove plate	7.50 to 8.00
Cast iron borings	3.00 to 3.25
Railroad malleable	8.00 to 8.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.50 to \$4.00
No. 2 heavy melting steel	3.50 to 4.00
Heavy melting steel (yard)	3.50 to 4.00
Stove plate breakable cast	5.00 to 5.25
Machine shop turnings	2.50 to 2.90
Short shoveling turnings	0.75 to 1.25
Cast borings	0.75 to 1.25
No. 1 blast furnace	0.50 to 1.00
Steel car axles	0.50 to 1.00

PITTSBURGH

Base per lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.85c
Reinforcing steel bars	2.60c
Cold-finished and screw stock	2.60c
Squares and hexagons	2.95c
Hoops and flats	3.45c
Hot-rolled annealed sheets (No. 24)	2.95c
25 or more bundles	3.10c
Galv. sheets (No. 24), 25 or more	3.10c
Hot-rolled sheets (No. 10)	3.35c
Galv. corrug. sheets (No. 24), per square (less than 3750 lb.)	3.61c
Spikes, large	2.40c
Small	2.65c
Boat	2.65c
Track bolts, all sizes	2.90c
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb. off list.	
Wire, black, soft ann'd base per 100 lb.	
Wire, galv. soft, base per 100 lb.	
Common wire nails, per keg	
Cement coated nails, per keg	
On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.	

CHICAGO

Base per lb.	
Plates and structural shapes	3.00c
Soft steel bars	2.75c
Reinforcing bars, billet steel, 1.55c to 1.70c	
Rail steel reinforcement	1.30c to 1.45c
Cold-finished steel bars and shafting	3.00c
Flats and hexagons	3.50c
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c
Hoops (No. 14 gage and lighter)	3.50c
Hot-rolled annealed sheets (No. 24)	3.45c
Galv. sheets (No. 24)	3.50c
Hot-rolled sheets (No. 10)	3.50c
Spikes (3/16 in. and lighter)	2.45c
Track bolts	2.75c
Rivets, structural (leg lots)	4.80c
Rivets, boiler (leg lots)	4.75c
Machine bolts Per Cent Off List	
Carriage bolts	
Coach and lag screws	
Hot-pressed nuts, sq., tap. or blank.	
Hex. head cap screws	
Flat head set screws	
Spring cotters	
Stove bolts	
Rd. hd. tank rivets, 7/16 in. and smaller	
Wrought washers	
No. 2 black ann'd wire, per 100 lb.	
Comm. wire nails, base per keg	
Cement c'd nails, base per keg	

NEW YORK

Base per lb.	
Plates and struc. shapes	2.95c
Soft steel bars, small shapes	3.10c
Iron bars, Swed. charcoal	3.24c
Cold-fn. shafting	5.90c to 6.25c
Rounds and hexagons	3.54c
Plats and squares	4.04c
Cold-rolled strip, soft and quarter hard	4.95c
Hoops	3.30c
Bands	3.30c
Hot-rolled sheets (No. 10)	3.30c
Hot-rolled ann'd sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.75c
Standard tool steel	4.50c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel 1/4 x 1/4 in. and larger	3.40c
Smooth finish, 1 to 2 1/4 x 1/4 in. and larger	3.75c

Spec. iron and steel pipe	\$2.50 to \$2.75
Forge fire	2.75 to 3.00
No. 1 railroad wrought	4.00 to 4.50
No. 1 yard wrought long	3.25 to 3.50
Rails for rolling	5.00 to 5.50
No. 1 cast	4.50
No. 2 cast	4.50
Stove plate (foundry)	4.50
Malleable cast (foundry)	4.50
Cast borings (chemical)	4.00 to 4.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	6.00 to 6.50
No. 1 hy. cast (cupola size)	\$9.00
No. 2 cast	7.50 to 8.00
No. 3 cast	4.00 to 4.50

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$5.00 to \$5.50
Scrap rails for melting	5.00 to 5.50
Loose sheet clippings	3.75 to 4.25
Bundled sheets	3.75 to 4.25
Cast iron borings	3.00 to 3.50
No. 1 busheling	3.00 to 3.50
No. 2 busheling	4.50 to 5.00
Rails for rolling	2.75 to 3.25
No. 1 locomotive tires	7.00 to 7.50
Short rails	7.00 to 7.50
Cast iron car wheels	6.50 to 7.00
No. 1 machinery cast	6.50 to 7.00
Burnt cast	6.00 to 6.50
Stove plate	4.25 to 4.75
Agricultural malleable	4.25 to 4.75
Railroad malleable	7.00 to 7.50

DETROIT

Dealers' buying prices per gross ton:	
Hy. melting steel	\$4.50 to \$5.00
Borings and short turnings	2.50 to 3.00
Long turnings	2.25 to 2.75
No. 1 machinery cast	7.75 to 8.25
Automotive cast	8.00 to 8.50
Hydraulic comp. sheets	4.25 to 4.75
Stove plate	3.00 to 3.50
New No. 2 busheling	3.75 to 4.25
Old No. 2 busheling	1.50 to 2.00
Sheet clippings	1.25 to 1.75
Flashings	2.75 to 3.25

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$7.00 \$8.00
Rails, scrap	7.00 6.00
No. 1 wrought	6.00 8.00
Machine shop turnings	2.00 2.00
Boiler plate	5.00 4.50
Heavy axle turnings	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.00 2.00
Steel axes	7.00 9.00
Axles, wrought iron	12.50 11.00
No. 1 machinery cast	12.50 10.00
Stove plate	10.00 8.00
Standard car wheels	10.00 8.50
Malleable	10.00 8.00

Warehouse Prices for Steel Products

Open-hearth spring steel, bases	
Common wire nails, base, per keg	
Machine bolt, cut thread:	
1/4 x 6 in. and smaller .65 to .65 and 10	
Carriage bolts, cut thread:	
1/4 x 6 in. and smaller .65 to .65 and 10	
Boiler tubes:	
Lap welded, 2-in. .18.24	
Seamless welded, 2-in. .19.24	
Charcoal iron, 2-in. .24.94	
Charcoal iron, 4-in. .63.65	
*No. 28 and lighter, 30 in. wide, 20c. higher per 100 lb.	

ST. LOUIS

Base per lb.	
Plates and struc. shapes	3.25c
Soft steel or iron	3.00c
Cold-fn. rounds, shafting, screw	3.35c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.00c
Hot-rolled sheets (No. 10)	4.00c
to and inc. 48 in. wide	3.00c
over 48 in. wide	3.15c
Gal. corrug. sheets (No. 24)	3.75c
Gal. corrug. sheets	4.05c
Structural rivets	4.00c
Boiler rivets	4.00c
Tank rivets, 7/16 in. and smaller, 100 lb. or more	
Less than 100 lb.	
Machine bolts	
Carriage bolts	
Lag screws	
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	
Less than 200 lb.	
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more	
Less than 200 lb.	

PHILADELPHIA

Base per lb.	
*Plates, 1/4-in. and heavier	2.45c
*Structural shapes	2.45c
*Soft steel bars, small shapes, iron	2.45c
Reinfor. steel bars, sq., twisted and deformed	2.45c
Cold-finished steel bars	2.30c
*Steel hoops	3.35c
*Steel bands, No. 12 3/16 in. incl.	3.00c
*Spring steel	2.75c
*Hot-rolled annealed sheets (No. 24)	5.00c
*Galvanized sheets (No. 24)	5.15c
*Hot-rolled annealed sheets (No. 10)	3.50c
Diam. pat. floor plates, 1/2 in. and larger	2.70c
Swedish iron bars	5.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deductions on orders aggregating 4000 lb. or over.
*For 50 bundles or over.

CLEVELAND

Base per lb.	
Plates and struc. shapes	2.95c
Soft steel bars	2.75c
Reinfor. steel bars	1.75c to 1.95c
Cold-fn. steel bars	2.95c
Flat rolled steel under 1/4 in. thick	3.00c
Hot-rolled strip	3.00c
Galvanized sheets (No. 24)	3.55c
Hot-rolled sheets (No. 10)	3.50c
Black ann'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

*Net base, including boring and cutting to length.

CINCINNATI

Base per lb.	
Plates and struc. shapes	3.25c
Bars, steel or iron	3.00c
New billet reinfor. bars	2.00c
Rails steel reinfor. bars	3.00c

PACIFIC COAST

	Base per lb		
	San Fran- cisco	Los Angeles	Seattle
truc. and			
....	3.15c.	3.30c.	3.00c.
....	3.15c.	3.30c.	3.00c.
....	3.00c.	3.00c.	3.00c.
....			
....	3.90c.	4.20c.	4.50c.
....			
....	3.37½c.	3.80c.	3.80c.
....			
....	4.55c.	4.50c.	5.00c.
....			
....			
....	5.75c.	6.00c.	5.25c.
....			
....	5.50c.	5.50c.	5.50c.
....			
....			
....	6.75c.	6.75c.	6.75c.
....	7.25c.	7.25c.	7.25c.
....			
....			
....			
....	\$2.40	\$2.40	\$2.40
....	2.40	2.40	2.40
....	2.40	2.40	2.40
....	2.05	2.05	2.05

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

National Elevator Co., Inc., Bronx, New York, Edward E. Bianco, 1910 Arthur Avenue, representative, recently organized by Vincent Federici, Bronx, and associates, plans works for manufacture of elevators, elevating machinery, conveying equipment, etc. Mr. Federici, formerly executive vice-president of Gurney Elevator Co., New York, will be president.

Porcelain Metals, Inc., 58 Sedgwick Street, Brooklyn, manufacturer of enameled metal products, plans one-story addition. Cost over \$25,000 with equipment. Horace Ginsberg, 205 East Forty-second Street, New York, is architect.

Manhattan Metal Products Co., Inc., Brooklyn, has been organized by Emanuel Spanier, 474 Saratoga Avenue, and associates, to manufacture metal goods.

Signal Supply Officer, Army Base, Brooklyn, asks bids until March 20 for one or two gasoline engine-driven power units (Circular 81); 15,200 insulators (Circular 82); until March 21 for 18 test sets (Circular 83).

Solar Mfg. Corp., 599 Broadway, New York, manufacturer of condensers and other electrical products, has leased additional 15,000 sq. ft., in building at location noted, making total of 25,000 sq. ft. for works.

Radio Corp. of America, Inc., 570 Lexington Avenue, New York, has purchased plant and business of DeForest Radio Co., Passaic, N. J., manufacturer of radio, television and telegraph equipment, vacuum tubes, etc., in receivership since June, 1932, for price of \$500,000. Company will operate as a subsidiary at same location.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for six corrosion resisting steel or aluminum steam-jacketed kettles, each 80 gal. capacity (Schedule 9712); one motor-driven bevel adjustable band saw (Schedule 9740) for Brooklyn Navy Yard.

Truxton Ornamental Iron Corp., Bronx, has been organized by Luigi Pedicini and Thomas Konicoff, to manufacture ornamental iron products. It will take over Truxton Blacksmith & Iron Works, 1190 Longwood Avenue, Bronx.

Department of Sanitation, Municipal Building, New York, has filed plans for a second garbage and refuse destructor plant at Lafayette and Zerega Avenues, Bronx, one-story, 196 x 219 ft. Cost about \$700,000 with machinery. Permit for similar plant on West 215th Street, costing like amount, was recently issued. Frank S. Parker, 119 West Fifty-seventh Street, New York, is consulting engineer.

Public Works Officer, Navy Yard, New York, asks bids until March 29 for electric switching equipment, central power plant, building No. 40 (Specification 7240).

D-V-Ator Corp. of America, Inc., New York, manufacturer of electrical equipment, has leased floor in building at 225 West Fifty-seventh Street, for new works.

New York Central Railroad Co., Albany, N. Y., is increasing operations at locomotive repair shops at West Albany, recalling about 1700 men.

Exact Tool & Level Mfg. Co., High Bridge, N. J., manufacturer of tools and mechanical equipment, is considering rebuilding of one-story plant, 30 x 170 ft., destroyed by fire March 4.

General Metal Mfg. Co., Newark, N. J., care of Jacob Lubetkin, 60 Park Place, representative, has been organized by Jacob Rekoon and David Segal, Newark, to manufacture metal goods; capital \$125,000.

Edison Cement Co., New Village, N. J., has resumed operations at local mill, following shutdown for several months, reinstating about 400 workers.

Metropolitan Stove Mfg. Corp., Garwood, N. J., recently organized, has leased large portion of plant of Aeolian Co., North Avenue, recently vacated, for new plant, including parts production and assembling, to be ready for operation in May. William F. Luthmann, formerly connected with Richardson & Roynston Co., Dover, N. J., manufacturer of stoves, ranges, etc., will be president and general manager.

Woburn Degreasing Co., 1200 Harrison Avenue, Kearny, N. J., manufacturer of

oils, grease, etc., plans rebuilding one-story unit, 75 x 150 ft., destroyed by fire March 4. Loss over \$40,000 with tanks and other equipment.

Mueller Studio, Inc., 322 Belmont Avenue, Newark, Karl Mueller, head, manufacturer of electrical equipment for churches and other special service, has leased 5000 sq. ft. floor space in building at Nineteenth Avenue and South Fifteenth Street, for new plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for one motor-driven diamond boring machine (Schedule 9735) for Philadelphia Navy Yard.

Plastic Products Corp., F. G. Getchell, Bloomsburg, Pa., head, has taken over property at Lewisburg, Pa., and will establish new plant for manufacture of plastic and celluloid specialties.

Coolair, Inc., Wilmington, Del., recently formed by James S. Fraser, Earleville, Md., and associates, to manufacture air-conditioning equipment, portable refrigerating machinery, etc., has leased space in building at Maryland Avenue and Elm Street for new plant. Mr. Fraser will be president of new company; Jonathan S. Wilford, treasurer, and James W. England, secretary.

P. H. Fitzgibbons Boiler Co., Ogdensburg, N. Y., manufacturer of boilers, tanks and other plate products, is planning to rebuild portion of plant destroyed by fire Feb. 28. Loss over \$45,000 with equipment.

Buffalo Structural Steel Corp., Buffalo, has been organized, capital \$70,000, by William G. Houck, 551 Lafayette Avenue, and J. P. Madigan, 450 Herkimer Street, to operate a steel fabricating works. Company will take over property of Buffalo Structural Steel Co., Dart Street.

Wilson-Jones Co., printer and bookbinder, 3300 Franklin Boulevard, Chicago, and 72 Walker Street, New York, will build a one-story printing plant at Elizabeth, N. J., containing 60,000 sq. ft. of floor space. Cost about \$100,000. Leo F. Caproni is consulting engineer.

◀ CENTRAL DISTRICT ▶

Standard Tin Plate Co., Canonsburg, Pa., has awarded general contract to Fort Pitt Bridge Works, Oliver Building, Pittsburgh, for one-story addition, 75 x 400 ft., for storage and distribution. Company is affiliated with Continental Can Co., 1 Pershing Square, New York.

Freedom Oil Works Co., Freedom, Pa., is carrying out expansion and improvements, to include new machinery for gasoline production. Cost over \$125,000 with equipment.

Oil Creek Refining Co., Titusville, Pa., will begin expansion and improvements at oil refinery, including new oil distillation unit with capacity of 1500 bbl. a day and other equipment. Contract for part of equipment has been awarded to Alco Products Co., Dunkirk, N. Y. Entire project will cost close to \$100,000.

Bucher & Gibbs Plow Co., Canton, Ohio, has been acquired by new interests, headed by Emil and Barnard Levene of Levene Motor Co., 2200 West Diamond Street, Philadelphia. New company has been organized under same name and will resume production of farm implements and equipment.

Klaas Machine & Mfg. Co., Cuyahoga Heights, Ohio, has been organized by Edwin O. Klaas, and associates, to manufacture machinery and parts. Company will take over organization of same name, with works at 4313 East Forty-ninth Street, and Weaver Brothers Co., 9315 Sandusky Avenue, S. E., manufacturer of platers' supplies.

Tuscora Brewing Co., Inc., Canton, Ohio, Edward Rommel, head, recently organized by Mr. Rommel and associates, has taken over former plant of Stark-Tuscarawas Breweries Co., and plans expansion and modernization. Addition will be built. Cost about \$200,000 with equipment.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 20 for 500 aircraft storage batteries (Circular 433); until March 21, 200 plunger assemblies, 200 binding post nuts, 200 insulator bushings, 100 plunger end guards, 100 housing assemblies, 100 coil assemblies (Circular 446), 401 gun trunnion bolt and bracket

assemblies, and 693 gun-mounting post assemblies (Circular 439); until March 22, gages (Circular 451), hand taps (Circular 442), 25 level winding mount assemblies, 51 gear assemblies, 40 clutch shifter levers, 150 lever and bracket assemblies, and 150 level winding guide shoes (Circular 452), 345 lathe mandrels (Circular 455); until March 27, bronze rods, strip and wire (Circular 459), 10,600 ft. steel tape armored cable (Circular 460).

Cincinnati Steel Products Co., Cincinnati, has been organized by John W. Herr, Cincinnati, and associates, to manufacture steel specialties. Company will take over organization of same name at Carrel Street and Pennsylvania Railroad.

Construction Service, Veterans' Administration, Arlington Building, Washington, plans new power plant at institution at Marion, Ind. Cost close to \$150,000 with equipment.

Wheel Engine Power Co., Inc., Gary, Ind., has been organized by Edgar D. Crumacker and Thomas Colosimo, Gary, to manufacture steam engines, parts and kindred equipment.

Brooke Brass Co., Greenville, Mich., recently organized, has taken over former plant of Bennett Brass Co., for manufacture of line of brass goods. New company is headed by B. L. Stanford, Romeo, Mich., heretofore general manager of Lee Brass Co., Imlay, Mich.

City Council, Midland, Mich., is considering erection of a municipal electric light and power plant, including distributing system. Cost about \$75,000 with equipment.

Consumers Power Co., Jackson, Mich., is planning extensions and improvements in power transmission lines and distributing systems. Cost about \$200,000 with equipment.

Coldwater Brass Co., Coldwater, Mich., has been organized by Alfred G. Morency, Coldwater, and associates, to manufacture brass goods for plumbing and other service.

Village Council, Morenci, Mich., is considering erection of a municipal electric light and power plant. Cost over \$60,000 with equipment.

◀ SOUTH ATLANTIC ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until March 20 for wrenches, brackets, wheels, rims and other truck parts (Circular 80).

Orange State Oil Co., Fifty-fifth Street, N. E., Miami, Fla., plans new bulk oil storage and distributing plant. Cost over \$35,000 with tanks and other equipment. Lee Wade, Exchange Building, is architect.

City Council, Radford, Va., has plans for new municipal hydroelectric generating plant on Little River, where site has been selected. Financing in amount of \$129,000 has been arranged.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 24 for 30,000 ft. rigid steel conduit, 16 transformers, 10,000 ft. copper wire, 66 knife switches, 100 meter service switches, 150 steel reflectors, 100 seamless steel reflectors, key sockets, fuses and other equipment (Schedule 2847).

National Park Service, Department of Interior, Washington, asks bids until March 20 for two 210-ft. steel radio towers at Acadia National Park, Big Moose Island, Schoodic Peninsula, Hancock County, Md.

Miami Brewing & Storage Co., 720 Olympia Building, Miami, Fla., has plans for new brewing plant. Cost over \$150,000 with equipment. Company was formed recently by Lewis Brown, Holleman Manors Co., address noted, and associates.

Annapolis Metropolitan Sewerage Commission, Annapolis, Md., J. G. Healy, chairman, plans installation of pumping machinery, pipe lines and other equipment for new sewage treatment plant and extensions in system. Bids will be asked early in spring. Cost over \$75,000. Robert Berwell, Municipal Building, is engineer; Whitman, Reardon & Smith, Baltimore Trust Building, Baltimore, are consulting engineers.

Jewell Ridge Coal Co., Tazewell, Va., has plans by Edward R. Feicht, 111 Old Lancaster Road, Bala-Cynwyd, Montgomery County, Pa., consulting engineer, for new

Service—

with Coats off



CHROMIUM

HIGH-CARBON FERROCHROME
(MAXIMUM 6% CARBON)

LOW-CARBON FERROCHROME
(IN GRADES, MAXIMUM 0.06%
TO MAXIMUM 2.00% CARBON)

CHROMIUM METAL
CHROMIUM-COPPER

MISCELLANEOUS CHROMIUM ALLOYS

SILICON

FERROSILICON 15%

FERROSILICON 50%

FERROSILICON 75%

FERROSILICON 80 TO 85%

FERROSILICON 90 TO 95%

REFINED SILICON

(MINIMUM 97% SILICON)

CALCIUM-SILICON

CALCIUM-ALUMINUM-SILICON

CALCIUM-MANGANESE-SILICON

SILICON COPPER

MISCELLANEOUS SILICON ALLOYS

MANGANESE

STANDARD FERROMANGANESE 78 TO 82%

LOW-CARBON FERROMANGANESE

MEDIUM-CARBON FERROMANGANESE

MANGANESE METAL

MANGANESE COPPER

MISCELLANEOUS MANGANESE ALLOYS

SILICO-MANGANESE

ALL GRADES INCLUDING SILICO-SPIEGEL

TUNGSTEN

VANADIUM

ALL GRADES

ZIRCONIUM

ALUMINUM-ZIRCONIUM

SILICON-ZIRCONIUM

ZIRCONIUM-FERROSILICON

ZIRCONIUM-MANGANESE-

SILICON

BRIQUETS

CHROME BRIQUETS

SILICON BRIQUETS

MANGANESE BRIQUETS

T

To make good alloy steel requires good ferro-alloys. Electro Metallurgical Sales Corporation offers a complete line of ferro-alloys of high quality backed by more than 25 years of experience.

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CARBIDE AND CARBON BUILDING

30 EAST 42ND STREET, NEW YORK, N. Y.

Electromet Ferro-Alloys & Metals

steam-electric power plant at properties near Richlands, Va. Installation will include two 1000-kw. turbine units, two 300-hp. water-tube boilers, stokers, pumps and other equipment. Cost over \$85,000.

J. R. Vaughan & Co., Mountain Trust Building, Roanoke, Va., plan installation of pumping machinery, pipe lines and other equipment for water supply systems at Elliston and Floyd, Va. Cost about \$75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for motor-driven boring mill (Schedule 9726), two motor-driven lathes (Schedule 9732), motor-driven emery grinder (Schedule 9729), faucets, cocks and valves (Schedule 9730), 24 electric ventilating fans (Schedule 9746), malleable and cast iron pipe fittings (Schedule 9747) for Eastern and Western Navy Yards; 9455 lb. corrosion-resisting steel rivets, 1944 lb. corrosion-resisting steel bars for Boston, Brooklyn, Philadelphia and Puget Sound yards (Schedule 9716); two motor-driven radial drills and spare parts (Schedule 9739), 50,000 lb. slab zinc (Schedule 9737) for Norfolk Navy Yard; 12,500 lb. corrosion-resisting steel tubes (Schedule 9715) for Boston, Brooklyn and Philadelphia yards; vacuum tubes (Schedule 9734) for Brooklyn and Mare Island yards.

◀ NEW ENGLAND ▶

Draper Corp., Hopedale, Mass., manufacturer of textile machinery and parts, plans extensions and improvements in erecting shop. Cost about \$35,000. **F. P. Sheldon & Son**, Hospital Trust Building, Providence, R. I., are architects.

J. B. Williams Co., Glastonbury, Conn., manufacturer of soaps, is considering branch plant at Bille LaSalle, Quebec, initial unit to cost close to \$50,000 with equipment. **J. B. Williams Co., Ltd.**, of Canada, is being organized to carry out project.

American Aluminum Products Corp., Bridgeport, Conn., has been organized by **D. H. Cotter**, 945 Main Street, and associates, to manufacture aluminum and other metal products.

Jenney Mfg. Co., 8 India Street, Boston, manufacturer of oil products, is considering addition to bulk oil storage and distributing plant at Chelsea, Mass.

Albert E. Cilley, 73 Eustis Street, Boston, machinist, has leased portion of ground floor in building at 44-48 Beverly Street for new shop.

Board of Education, Northbridge, Mass., is considering manual training department in addition to junior high school. Cost over \$100,000. **Angell & Swift**, 87 Weybosset Street, Providence, R. I., are architects.

Bergeron Products, Inc., Holyoke, Mass., has been organized by **Cornelius J. Crean**, 50 Laurel Street, and associates, to manufacture engines and parts, and other equipment. **Mr. Crean** will be treasurer; **Alfred Bergeron** is president.

◀ MIDDLE WEST ▶

Mutual Ice & Beverage Co., Chicago, recently organized, has taken title to property of **Mutual Brewing Co.**, Twenty-second Street and Turner Avenue, 185 x 266 ft., with several units from one to five stories. New owner is planning improvements and modernization, including new equipment.

Midland Wire & Metal Products Co., Room 2103, 105 West Madison Street, Chicago, has been organized by **L. W. Harback** and **J. J. Friedman** to manufacture metal products and wire goods.

Common Council, Wapello, Iowa, is planning erection of municipal electric light and power plant. Cost over \$65,000 with equipment. **H. L. Cory Co.**, Redick Tower Building, Omaha, Neb., is consulting engineer.

Cold Spring Brewing Co., Cold Spring, Minn., is considering expansion and improvements, including new bottling and other equipment. Cost over \$100,000 with machinery. **Ferdinand Peters** is secretary.

K. O. Lee & Son Co., 114 First Avenue, N. E., Aberdeen, S. D., will soon begin work by day labor on rebuilding of one-story motor tool manufacturing works recently destroyed by fire. Cost over \$40,000 with equipment.

United States Engineer Office, 333 North Michigan Avenue, Chicago, will ask bids soon for power house at Marseilles Dam, Ill.

Common Council, Winfield, Iowa, has plans for a municipal electric light and power

plant. Cost over \$60,000 with equipment. **H. L. Cory Co.**, Redick Tower Building, Omaha, Neb., is consulting engineer.

Station WDGY, 909 West Broadway, Minneapolis, W. W. Young, manager, is planning new two-story broadcasting station on Wayzata Boulevard, near city limits, with steel towers, power station and other structures. Cost over \$40,000 with equipment.

Jacob E. Decker & Sons, 320 Fifteenth Street, N. E., Mason City, Iowa, meat packers, have asked bids on general contract for an addition. Cost about \$45,000 with equipment.

United States Superintendent of Lighthouses, 432 Federal Building, Milwaukee, has extended time from March 20 to March 31 for taking bids on one cast-iron lantern house, third order, complete, 8 ft. 9 in. diameter, 17 ft. high, for new \$175,000 lighthouse at North Manitou Shoal, near Leland, Mich.

Edgerton, Wis., Common Council has authorized \$30,000 bond issue for erection and equipment of new sewage disposal plant. **W. G. Kirchhoffer**, 22 North Carroll Street, Madison, Wis., is consulting engineer. **Alfred Teisberg** is city clerk.

Milwaukee Metal Spinning Co., 227 East Lincoln Avenue, Milwaukee, is making alterations and additions to equipment, increasing capacity about 50 per cent. Upon completion of work entire force will be recalled.

◀ SOUTHWEST ▶

Rotary Harvester Corp., Kansas City, Mo., recently organized by **R. A. Miller**, 4324 Troost Street, and associates, will take over **Jayhawker Harvester Corp.**, carrying out a reorganization, and will specialize in manufacture of harvesting machines, replacement parts, etc. **Mr. Miller** will be secretary; **William C. Edwards** is president.

Missouri-Kansas & Texas Railway Co., St. Louis, is arranging early resumption of operations at repair shops at **Parsons, Kan.**, **Sedalia, Mo.**, and **Waco, Tex.**, for at least three months, reinstating about 775 men.

Continental Oil Co., Ponca City, Okla., will carry out expansion and improvements at local refinery for gasoline production, including additional equipment. Cost about \$100,000 with equipment.

Simmons Automatic Valve Co., Longview, Tex., has been organized by **R. G. Showalter**, Longview, and associates, to manufacture valves and kindred engineering products.

Tarrant Mining Co., Fort Worth, Tex., is planning early development of cinnabar mining properties near Terlingua, Tex., for quicksilver production, and will install equipment.

Dixie Jubal Co., San Marcos, Tex., care of **San Marcos Chamber of Commerce**, is negotiating for local property for establishment of new plant for manufacture of automobile radio equipment and parts.

Freer Utilities Co., Freer, Tex., is planning erection of new electric power plant and pumping station, and will soon purchase engine-generator and other equipment. Company also plans new ice-manufacturing plant. Cost over \$90,000 with equipment. **P. G. Silber**, **Bedell Building**, and **L. D. Royer**, **Smith-Young Tower Building**, both San Antonio, are architect and engineer, respectively.

◀ SOUTH CENTRAL ▶

Continental Can Co., Inc., 1 Pershing Square, New York, has plans for extensions, improvements and installation of equipment in former factory of **Chase Bag Co.**, Memphis, Tenn., totaling about 45,000 sq. ft. floor space, acquired few weeks ago. Proposed to begin work early in April.

Trinity Bag & Paper Co., 23 West Forty-third Street, New York, has begun superstructure for one-story plant, 90 x 200 ft., at **West Monroe, La.**, adjoining property of **Brown Paper Mill Co.** Initial installation will include 16 machines for manufacture of bags and paper containers. Present plant at **Brooklyn, N. Y.**, will be removed to new location. Cost over \$75,000 with equipment. **Benjamin Mintz**, company official, is in charge.

Louisiana Power Corp., Oberlin, La., care of **F. H. Willmont**, 1626 West Magnolia Street, San Antonio, Tex., president, is planning new hydroelectric generating plant on **Calcasieu River**, near Oberlin, in connection with irrigation system for rice plantation. Cost over \$350,000 with equipment.

New Orleans Compress Co., New Orleans, let general contract to **Gervais F. Favrot**, **Balter Building**, for one-story addition to cotton compress plant at **Alabo**, 80 x 425 ft. Cost over \$60,000 with equipment. **J. F. Coleman Engineering Co.**, **Hibernia Bank Building**, New Orleans, is engineer; **Robert J. Cummins**, **Houston, Tex.**, is consulting engineer.

◀ PACIFIC COAST ▶

Hauser Brewing Co., Los Angeles, recently organized by **Louis A. and E. C. Hauser**, officials of **Hauser Packing Co.**, 2330 East Ninth Street, has plans for new brewery adjoining works of packing company. Cost about \$350,000 with equipment. **Claud Beelman**, **Union Bank Building**, is architect.

Continental Can Co., 155 Montgomery Street, San Francisco, with headquarters at New York, has filed plans for one-story storage and distributing plant, 104 x 178 ft., at **San Jose, Cal.** General contract recently was let to **Austin Co. of California, Inc.**, Los Angeles. Cost close to \$50,000 with equipment.

City Council, Burlingame, Cal., is considering new municipal electric light and power plant. Cost about \$863,000 with engines, traveling crane and other equipment. **Schoemaker, Hackett & McIntyre**, San Francisco, are consulting engineers.

Rainier Brewing Co., Seattle, is planning to rebuild portion of plant recently damaged by fire. Loss about \$40,000 with equipment.

Yukon Oil Burner Co., Inc., Seattle, care of **Spencer Gray**, 1602 Smith Tower Building, representative, has been organized by **Garnet C. Olson** and **William A. Kelley** to manufacture oil burners and oil-burning equipment, furnaces, etc.

Akron Gold Mining Co., Tucson, Ariz., **Herbert H. Huntsberg**, Tucson, vice-president, in charge, is planning new milling plant at **Jaeger gold mining properties** in **Comobabi district**, near Tucson. Cost over \$65,000 with machinery.

Pacific Brewing & Malting Co., 943 Russ Building, San Francisco, associated with **Cope Investment Co.**, same address, has plans for extensions and improvements in plant at **San Jose, Cal.**, including one-story addition in bottling works, and installation of equipment in other departments. Cost over \$85,000 with machinery.

City Council, Zillah, Wash., is planning installation of electric operated deep-well pumping machinery, 100 and 40-gal. per min. capacity, respectively, and other equipment in connection with extensions and improvements in water supply system.

Southern California Ornamental Iron & Metal Products, Inc., Los Angeles, care of **William Berger**, 1006 Union Bank Building, representative, has been organized by **T. P. Giachetti** and **Joseph L. Savino**, Los Angeles, to manufacture ornamental and other iron specialties.

◀ FOREIGN ▶

Alliance Artificial Silk, Ltd., Lowestoft, England, manufacturer of rayon products, is arranging new capital stock issue about £300,000 (approximately \$1,038,000), portion of fund to be used for expansion of acetate plant and installation of additional machinery.

General Tire & Rubber Co., Akron, Ohio, has acquired controlling interest in **Compania Hulera El Popo, S. A.**, Mexico City, Mexico, and will operate as a subsidiary. **Ramon D. Cruz** will continue as managing director.

Ministry of Communications, Rome, Italy, **Constanzo Ciano**, Minister, is arranging fund of \$10,000,000 for development of oil field properties in **Albania**, to be expended at rate of \$2,500,000 a year during next four years. Program will be largely for fuel oil supply for **Italian State Railways**, and will include installation of drilling machinery, pipe lines, oil storage and distributing plants and other operating structures.

British Titan Products Co., Ltd., London, England, has been organized as interest of **National Lead Co., New York**; **Imperial Smelting Corp.**, **Imperial Chemical Industries, Ltd.**, and **Goodlass Lead Industries, Ltd.**, all of London, to manufacture and distribute titanium oxide pigments and other titanium products. At present, plant of **National Lead Co.** in **Germany** will be used as source of supply and later it is planned to erect plant in England.

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HARRISBURG

Forged and Seamless Steel Products

Losses of 20 Steel Companies in 1932 About \$150,000,000

Producers Representing 89 Per Cent of Industry Show
Decline of \$520,000,000 From 1929

A NET loss of nearly \$150,000,000 was incurred during 1932 by 20 leading steel-making companies, with a rated ingot capacity of approximately 62,000,000 tons, or about 89 per cent of the country's theoretical productivity. Only companies which actually produce raw

steel are included in the attached table, and only two of them, the National Steel Corp., Pittsburgh, and the Granite City Steel Co., Granite City, Ill., succeeded in breaking even or making a small profit. In all cases net profit or loss is taken after all charges, including bond interest, but

before dividends on common or preferred stock.

In 1931 these same 20 companies had a net loss of only \$16,346,403. They had a net profit of \$172,728,807 in 1930, and record earnings of \$370,777,857 in 1929. The decline in net return over the four-year period was thus more than \$520,000,000.

Only three major companies were able to reduce their losses last year, as compared with 1931. American Rolling Mill Co., Middletown, Ohio, reduced a loss of more than \$3,000,000 in 1931 to slightly over \$2,000,000 in 1932. The loss of the Gulf States Steel Co., Birmingham, declined from \$976,230 to \$518,313. The Wheeling Steel Corp., Wheeling, W. Va., bettered its 1931 record only slightly.

Steel Company Profits and Losses Over Last Four Years

	Latest Rated Ingot Capacity	Net Profits—Asterisk Indicates Loss			
		1932	1931	1930	1929
Allegheny Steel Co.	450,000	*\$1,052,080	\$50,228	\$1,610,292	\$3,311,492
American Rolling Mill Co.	1,902,000	*2,029,602	*3,098,445	114,094	6,110,570
Bethlehem Steel Corp.	9,540,000	*19,404,431	115,745	23,843,406	42,242,980
Colorado Fuel & Iron Co.	840,000	*4,253,261	*3,363,206	298,648	2,350,048
Continental Steel Corp.	280,000	*501,486	*406,584	*37,908	932,030
Crucible Steel Co. of America.	875,000	*3,613,616	*2,016,517	4,045,122	8,162,343
Granite City Steel Co.	360,000	13,827	332,319	700,716	1,632,690
Gulf States Steel Co.	450,000	*518,313	*976,230	*815,334	1,310,301
Inland Steel Co.	2,000,000	*3,045,628	1,263,599	6,498,967	11,712,374
J. & L. Steel Corp.	3,420,000	*7,910,149	*2,283,459	9,093,287	20,848,749
Ludlum Steel Co.	22,000	*474,310	*99,144	*433,697	919,531
Midvale Co.	200,000	*245,782	750,116	1,403,728	1,368,033
National Steel Corp.	2,232,000	1,662,919	4,443,323	8,415,822	12,573,683
Otis Steel Co.	828,000	*2,830,155	*1,571,342	868,729	3,687,690
Pittsburgh Steel Co.†	720,000	*2,501,081	*1,713,762	1,689,692	4,535,437
Republic Steel Corp.	4,968,000	*11,261,194	*9,034,152	*3,522,003	20,526,813
Sharon Steel Hoop Co.	450,000	*2,016,269	*1,396,995	*752,803	1,341,215
U. S. Steel Corp.	27,841,300	*71,271,799	13,038,141	104,421,571	197,592,060
Wheeling Steel Corp.	1,500,000	*3,274,832	*3,339,139	2,688,601	8,005,644
Youngstown Sheet & Tube Co.	3,120,000	*13,272,783	*7,040,899	7,036,132	21,564,174
Total	61,998,300	*\$149,476,771	*\$16,346,403	\$172,728,807	\$370,777,857

*Net Loss. †Year Ended June 30.

Iron and Steel Standards Proposed at Testing Materials Meeting

(Concluded from Page 436)

bolt and extra-refined wrought-iron bars be advanced to standard. These revisions, issued in 1931, included changes in the physical properties of extra-refined wrought-iron bars. The changes in tensile strength for 1¼ sq. in. or under in sectional area involved a reduction from 48,000—54,000 to 48,000—53,000 lb. per sq. in.; over 1¼ sq. in. in sectional area, a reduction of 48,000—54,000 to 47,000—53,000. Flat bars, 3/16 in. in thickness and less, used for window sash, are to have a tensile strength of 47,000 lb. per sq. in., a yield point minimum of six-tenths ultimate strength, a minimum elongation of 22 per cent, with a minimum reduction of area of 30 per cent.

Requirements for micrographic examination will also be included in all of the wrought-iron and wrought-iron products specifications with the exception of those covering common bars if the committee recommendations are approved at the meeting in June. A tentative revision in the

specifications for welded wrought-iron pipe (A72-31) was recommended for approval; this consists of limiting the manganese to a maximum of 0.05 per cent.

Gray-Iron Casting Specifications

Committee A3 on cast iron voted to recommend the adoption of the tentative specifications for gray-iron castings (A48-32T) as standard. It will be recalled that these specifications were formulated by Committee A3 with the cooperation of the Gray Iron Institute (and not the reverse order of action as suggested in these columns Feb. 9, page 234), and were approved for publication as tentative at the June, 1932, meeting of the society. These specifications, which include classifications ranging from 20,000 to 60,000 lb. per sq. in. tensile, were drawn up to supersede all individual specifications previously existing.

The Committee on Cast Iron is co-operating in preparing for a joint

symposium on cast iron, sponsored by the American Foundrymen's Association and the society, to be held probably on June 26, in Chicago.

Steel Corporation's Output in 1932 Lowest in History

(Concluded from Page 437)

in 1931. The average earnings per employe per day last year were \$5.17, compared with \$5.90 in 1931. The report gives the following comparison of the average daily earnings per employe at the respective dates named:

October, 1932	\$4.81
October, 1931	5.47
October, 1923	5.89
October, 1921	4.60
October, 1913	2.93

Pensions were granted during the year to 2031 retiring employes. At the end of the year there were 11,684 names on the pension rolls, a net increase of 1247 during the year. The total amount of pensions paid in the year was \$7,524,487, against \$5,830,447 in the previous year. The average pension paid last year was \$69.45 a month. The average age of employes retiring on pensions during the year was 62.45 years and their average range of service was 33.67 years.

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Pacific Coast Distributors—Columbia Steel Company, San Francisco, California.

Export Distributors—United States Steel Products Company, New York, N. Y.

An Insulating Refractory for Heating Furnaces

(Concluded from Page 433)

tion of the one for the other would, from the standpoint of weight alone, reduce the heat-storage capacity 75 per cent. In addition, the conductivity of the new material is roughly one-fourth of that of firebrick, so the thickness of a furnace wall may be reduced to this fraction and yet have no higher heat losses by conduction and radiation. It is stated, therefore, that the heat-storage capacity of a furnace lined with the new firebrick, and having the same heat losses due to conduction and radiation as a furnace lined with ordinary fireclay brick, will have a heat-storage capacity approximately one-sixteenth that of the firebrick-lined furnace. The amount of fuel required during the heating-up process is proportional to the heat-storage capacities of the two different types of linings.

As an illustration of these statements, a wall of B & W No. 80 Insulating Firebrick $4\frac{1}{2}$ in. thick has practically the same resistance to the flow of heat as a firebrick wall 18 in. thick. The weight of the former, however, is only 12.8 lb. per sq. ft., and the weight of the latter is 187 lb. per sq. ft., a ratio of 1 to 14.6. The firebrick wall absorbs 67,000 B.t.u. per sq. ft. as it is brought to thermal equilibrium when the furnace face is at a temperature of about 2500 deg. F., and the wall of B & W insulating firebrick absorbs only 4000 B.t.u. per sq. ft., a ratio of 16.75 to 1.

Savings in Time of Heating Up

In addition to the saving in fuel, which may be credited to low heat-storage capacity, is the time saved in heating up. This may result in a saving in man-hours, or in an increase in production capacity per furnace unit, or both. If the saving is in furnace capacity, the higher output per furnace reduces the capital charges.

Low heat-storage results not only in a material saving in the cost of fuel required to heat up a furnace but also in greater sensitiveness of the furnace. This is an advantage in that, where it is necessary to change the temperature of a furnace to suit different thicknesses of stock, there is no lag in effecting the change. Further, since the furnace enclosure may be constructed of B & W No. 80 Insulating Firebrick so that the walls, roof, and floor have the same heat flow, the temperature throughout the entire furnace will be exceptionally uniform.

It is also pointed out that a refractory, such as this new insulating firebrick, has advantages from the standpoint of original cost of a furnace. These advantages are due to the thinner walls requiring less steel for en-

casing, and to its light weight, which requires lighter supporting and buck-staying steel.

Load Carrying Qualities Excellent

The load-carrying qualities of this new material are considered excellent. The capacity of the new brick for carrying loads at high temperatures, without deformation, is claimed to make possible the use of this brick under severe temperature conditions in arches and in high furnace structures.

According to the company's engineers, the advantage of using the insulating firebrick for suspended roofs of furnaces is apparent when it is considered that the resistance to heat flow of a suspended firebrick arch is the resistance offered by the firebrick tile, measured from the furnace face to the supporting casting, if this is embedded in the tile, or to the upper surface if outside suspension is used. The addition of insulation to the upper surface is not an efficient method of reducing heat losses through the arch, as the heat flow through the metal suspension members is increased by the resulting higher mean temperature of the tile. By building such arches of the new firebrick, the effect is that of placing the insulation between the source of heat and the metal suspension members, which are good conductors of heat, thereby reducing the amount of heat that is carried off and dissipated by them. In addition, by offering greater resistance to the flow of heat to the supporting members, it protects them from overheating.

The new bricks are recommended by the makers for the linings of oil and gas-fired furnaces, resistance-type electric furnaces, process equipment and coal-fired equipment if not exposed to mechanical abrasion and slag action. Installations in these fields it is stated have been numerous and successful.

The Steel House—A Problem in Merchandising

(Concluded from Page 432)

the design of standardized steel skeletons.

If the 30,000 retail distributors of building materials were equipped with these key plans, they could be encouraged to add structural steel to their stock in trade. If the American Institute of Steel Construction, in co-operation with the American Iron and Steel Institute, should undertake to

prepare complete technical data for a series of small structures, the results, properly broadcast, would accomplish more to introduce a knowledge of the useful application of steel skeletons to small structures throughout the building world than could any other form of publicity. The cost of this work would be trivial and it would be effective because it would reach the home builder through his accepted trade channels, and give him something tangible to study.

The average small builder is no fool. If steel skeleton construction can help him to lower costs, by speeding up his construction, he will gladly study its possibilities. But he must be equipped with tangible data. He must be shown. Certainly it is the function of the recognized research and promotion departments of the steel industry to do the showing.

Henry L. Crowley & Co., West Orange, N. J., ceramic engineers and manufacturers, have developed a liquid porcelain cement, which is available in three consistencies: a cement paste for application with trowel or similar tool; a dipping cement for dipping, spraying or brushing, and a dry powder for mixing with water. The cement paste is intended for use in production assembly work for holding small parts in place and for filling holes and cracks. The dipping cement is for coating electrical resistors and radio coil forms as well as for general adhesive purposes. The dry powder form, which can be prepared as needed, is preferable for bulk use. Advantages claimed for this product include its low cost, proof against water, oil, acids, gases and heat up to 2000 deg. F. and its insulating qualities.

A paint, which, when mixed with any normal oil paint vehicle, is said to produce a metal primer that affords exceptional protection against atmospheric conditions and mild solutions of acids, alkalies, and brines, has been developed by the Eastern Mabelite Corp., 225 Mercer Street, New York. This pigment is produced by using mabelite ore, which contains a suitable conglomerate of ferric oxide, silica, and aluminum, and putting it through a new grinding process that more finely regulates the pigment particle size. The coating, which combines an iron oxide-sand coat finish, is claimed to be resistant to mechanical injury. Successful application, it is said, has been made to metal pipe lines, tanks and concrete.

Wean Engineering Co., Inc., Warren, Ohio, has been granted Canadian letters patent No. 329,901 covering improvements in methods and apparatus in making sheets, and the like. This method involves the use of continuous furnaces and automatic feeding and catching tables.



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Modern Forging Equipment More Efficient

THE review of machine tools, power presses and welding equipment in THE IRON AGE of Jan. 5 reflected continuance of the noteworthy progress of the past few years in the direction of increased productiveness, easier operation and greater flexibility. Similar progress has been made in forging equipment, current designs giving both higher output and closer accuracy. In board and steam drop hammers the newer machines are designed to give the highest ratio of useful work to power impact and to operate with the minimum amount of down time. In some cases the newer designs permit an hourly production increase of 28 per cent or more. The aggregate or total production increase over a period of time will probably be in the neighborhood of at least 40 per cent, due to longer periods of operation without the necessity of stopping for adjustments or repairs, states one authority.

In one line increased production of forgings to close tolerances is attributed to balanced design based on the results of laboratory research. The correct relation between ram weight, ram velocity and anvil weight, has been determined, so that maximum of applied energy is absorbed by the forging, thus diminishing the number of blows necessary.

In the steam drop hammer field one company has developed a ring-type motion valve claimed to effect markedly lower steam consumption. The same company introduced a variable-stroke control for its board drop hammers. With this, the operator has available either a light or heavy blow, a short or a long stroke, and can change from one to the other without an instant's delay. The hammer is treadled in the usual manner and the length of stroke is governed by a slight working of the foot on the treadle.

Heavy forging presses equipped with an automatic feeding mechanism are now built. It has been stated that the production possibilities of such machines are tremendous and the effect of these developments may be far-reaching. One such heavy-duty forging press developed during the past year has a friction clutch operated by air pressure, and an eccentric and ram construction that eliminates the usual pitman or connecting rod. Provision is made for working the stock progressively in several impressions, but the feeding of the stock through the press is automatic so that the finished forgings, or in case multiple dies are used, a number of forgings in a strip, are completed and ejected from the press at each stroke.

Forging machines of modern design

produce work that requires comparatively little machining. An example of the work for which such machines are more adapted than the older types is cluster gears in which the deep pierced hole is comparatively large. Formerly it was considered impractical to use the sliding dies such as now used for this work. Savings in material, as well as elimination of machining operations, are advantages of the newer practice. In one machine used for such work, the accuracy obtained is attributed to an overarm heading slide which permits use of a short, stiff bed frame, and to the underarm grip slide which prevents cocking open of the dies during the forging operation.

Heavy-duty forging machines provided with a friction drive have been made available. Instantaneous starting of these machines is obtained by

New Nickel-Base Chromium Alloy

The name Inconel has been given to a nickel-base chromium alloy developed by the International Nickel Co., Inc., for the dairy industry. Inconel is an alloy produced by adding to nickel sufficient chromium to give it stainlessness without, at the same time, having any harmful effects on the malleability or workability of the material. The chromium content is from 12 to 14 per cent. The iron content is about 6 per cent. Inconel was first introduced to the industry a little more than a year ago, and since that time has been installed in every type of dairy and ice cream service.

Advantages claimed for Inconel are:

- (1) Highly resistant to corrosion by all dairy products, refrigerating brines, ammonia and cleaning and sterilizing compounds.
- (2) Non-rusting.
- (3) Non-tarnishing—attractive in appearance.
- (4) Non-contaminating.
- (5) Excellent welding and fabricating properties.
- (6) Equipment has satisfactory heat transfer projection.
- (7) Easily and thoroughly cleaned.
- (8) Makes the strongest and most durable dairy equipment.

The three principal features of the corrosion resistance of Inconel are stainlessness, resistance to pitting penetration by brines and its amenability to welding without danger of subsequent weld decay, it is asserted.

Inconel is hardened by cold working at about the same rate as pure nickel and, therefore, its fabricating qualities are about the same. The metal

slight pressure on the foot treadle. Starting is smooth and operation is quiet. Because of the quick starting there is no loss of heat from the stock being worked. The heading tool has a positive movement without play or backlash, which permits the material to flow uniformly. In cushioning the starting and stopping action this friction drive eliminates shock to the machine and motor.

A new all-steel bulldozer featuring a power-adjusted die holder that reduces setting up time has been developed. The bending parts of the dies are fastened to the ram and slide and are brought together merely by pressing a push button. Another advantage of the arrangement is that it permits long tie rods to be run to the operating head of the machine.

In a new electric header and heater, cold stock fed into the machine from a coil, is cut to length, heated locally to forging temperature and then headed. Equipped with a magazine feed, the machine will head blanks that have been previously threaded or otherwise machined. Operation is continuous and high rates of production are obtainable.

is being drawn into shapes without difficulty. It lends itself well to lock seaming and soft soldering and the bond between the solder and the metal is excellent. It can be brazed or silver soldered. Welding is being accomplished by both oxy-acetylene and arc welding methods. It is stated that this alloy welds more readily than the other metals used for dairy machinery construction, and that welded joints in Inconel are not subject to intergranular deterioration nor do they require heat treatment to bring out best corrosion resistance. Metallic arc welding is said to be highly practical with all heavy gages and even as light as 18 gage. The ductility of the metal permits the ready fabrication of tubes into coils.

Inconel seamless tubing with inside sanitary finish is available in sizes 1½ in. and larger and is recommended for all dairy applications. Special lipped tubing is also available for cooler construction. Pure nickel sanitary tubing is also available in all sizes 1 in. and larger.

Dover Stamping & Mfg. Co., 385 Putnam Avenue, Cambridge, Mass., in commemoration of its 100th year in business has issued an interesting brochure, containing a historical sketch of the company's growth since its founding by Horace Whitney in 1833. Control of the business has been passed along to four successive generations of the Whitney family, which is now represented in the company by Carleton S. Whitney, president, and Allen F. Whitney, treasurer. Louis S. Cleaves is vice-president and general sales manager.